135-TRC-08-003

SAFETY COMPLIANCE TESTING FOR FMVSS 135
Passenger Car Brake Systems

General Motors Corporation
2008 Saturn Outlook FWD XE, 4-door MPV
NHTSA No. C80101

TRANSPORTATION RESEARCH CENTER INC.
10820 State Route 347
East Liberty, Ohio 43319

Final Report Completed: December 12, 2007

FINAL REPORT

Prepared Under Contract No.: DTNH22-06-C-00033

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
1200 New Jersey Avenue S.E.
West Building 4th Floor
OVSC (NVS-221)
Washington, DC 20590

Prepared for the Department of Transportation, National Highway Traffic Safety Administration, under Contract No. DTNH22-06-C-00033.

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Prepared By _____

Approved By _____

Approval Date: 12/12/07

Final Report Acceptance By OVSC:

_____

Contract Technical Manager, Office of Vehicle Safety Compliance

1/2/08

_____

Acceptance Date

1. REPORT NUMBER: 135-TRC-08-003	2. GOVERNMENT ACCESSION NO.:	3. RECIPIENTS CATALOG NO.:	
4. TITLE AND SUBTITLE: Final report of FMVSS 135 Compliance Testing of a 2008 Saturn Outlook FWD XE, 4-Door MPV, NHTSA No. C80101		5. REPORT DATE: December 12, 2007 6. PERFORMING ORGANIZATION CODE: TRC 20060110/8355	
7. AUTHOR(S): Project Manager: ALAN IDA Project Engineer: RANDALL A. LANDES		8. PERFORMING ORGANIZATION REPORT NO.: TRC-DOT-135-077	
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Transportation Research Center Inc. 10820 State Route 347 East Liberty, Ohio 43319		10. WORK UNIT NUMBER: 11. CONTRACT OR GRANT NO.: DTNH22-06-C-00033	
12. SPONSORING AGENCY NAME AND ADDRESS: U.S. Department of Transportation National Highway Traffic Safety Administration Enforcement Office of Vehicle Safety Compliance (NVS-221) 1200 New Jersey Avenue S.E. West Wing 4th Floor Washington, DC 20590		13. TYPE OF REPORT AND PERIOD COVERED: Final test report Tested: 10/12/07 to 12/12/07 14. SPONSORING AGENCY CODE: NVS-221	
15. SUPPLEMENTARY NOTES:			
16. ABSTRACT: Compliance tests were conducted on the subject 2008 Saturn Outlook FWD XE, 4-Door MPV, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-135-01 for the determination of FMVSS 135 compliance. Test failures identified were as follows: None.			
17. KEY WORDS: Compliance Testing Safety Engineering FMVSS 135		18. DISTRIBUTION STATEMENT: Copies of this report are available from: NHTSA Technical Information Services NPO-411 1200 New Jersey Ave, S.E. Washington, DC 20590 Email: tis@nhtsa.dot.gov FAX: 202-493-2833	
19. SECURITY CLASSIF. (OF THIS REPORT): Unclassified	20. SECURITY CLASSIF. (OF THIS PAGE). Unclassified	21. NO. OF PAGES: 70	22. PRICE:

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1.0 INTRODUCTION

Tests were conducted on a 2008 Saturn Outlook FWD XE, 4-door MPV, manufactured by General Motors Corporation, to determine compliance with FMVSS 135 "Passenger Car Brake Systems." All tests were conducted in accordance with the U.S. D.O.T., NHTSA Laboratory Procedure TP 135-01 and/or the corresponding TRC Inc. Test Procedure that was submitted to NHTSA for their approval. The Test Procedure was clearly described in the submitted document and has not been repeated in this report.

All stops were performed manually.

All tests were conducted by TRC Inc. personnel using the following TRC facilities:

7.5-Mile Test Track
Vehicle Maximum Speed
Burnish
Heating Snubs and Hot Performance Stops
Brake Cooling and Recovery Stops

Skid Pad
Cold Effectiveness Stops
High Speed Effectiveness Stops
Stops with Engine Off
Failed ABS
Failed Variable Proportioning Valve (if applicable)
Failed Hydraulic Circuits
Brake Power Assist Unit Failures
RBS Failure (if applicable)
EMF (Battery) Failure (if applicable)

Brake Slope
Parking Brake

Average PFC during the test period was 1.01 (Skid Pad) and 1.00 (Test Track) utilizing the ASTM E1337 w/E1336 tire method.

The test vehicle was ABS equipped. Therefore, the Wheel Lock Sequence and Adhesion Utilization Tests were not performed.

This vehicle met the requirements of FMVSS 135.

DATA SHEET 1 - VEHICLE INFORMATION

VEHICLE SPECS

Year:	2008	NHTSA No:	C80101
Mfr:	GENERAL MOTORS CORP.	GVWR (Kg):	2908
Make:	SATURN	GAWR Front(Kg):	1450
Model:	OUTLOOK FWD XE	GAWR Rear(Kg):	1600
Body Style:	MPV	Wheelbase (mm):	3022.6
Mfr. Date:	06/07	Odometer:	Start:29 MI. End:511 MI.
VIN:	5GZER13718J111834		

BUSES ONLY

Chassis Mfg.:	N/A
Serial No.:	N/A
No. of Seats:	N/A
Manufacture Date:	N/A

Engine Type:	GASOLINE,EFI,V6,VVT,DOHC,PISTON		
Displacement:	3.6 LITER	Tire Size:	P255/65R18
Engine Hspwr:	N/A	Tire Type:	FORTERA,1095,HL EDITION,M+S,RA
Idle Speed(rpm):	83.776	Tire Mfr.:	GOODYEAR
Transmission Type:	AUTO.6-SPD	GVWR Front Press.(kpa):	241.32
No. of Axles:	2	GVWR Rear Press.(kpa):	241.32

BRAKE APPLY SYSTEM

Brake Series:	Front:DISC Rear:DISC	Power Assist Unit:	YES
Brake Actuation (Hydr. Circuit Split):	DIAGONAL	Pwr Unit w/Accumulator:	NO
Power Unit:	HYDRAULIC	Pwr Asst./Pwr Unit w/Backup:	NO
Anti-Skid unit Mfr:	BOSCH	Variable Prop. System:	NO
Parking Mechanism:	YES	Anti-Skid Device:	YES
Type of Parking Unit:	AUTOMATIC TRANSMISSION WITH PARK DETENT.		
Mstr Cylinder Dia(mm):	0.00	Pedal Ratio:	3.00: 1

FRONT SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE:	DISC	Material:	CAST IRON
Drum Construction:	N/A	LF Drum Shoe Cage Dia.(mm):	0.00
Disc Construction:	INTEGRAL CAST,VENTED	RF Drum Shoe Cage Dia.(mm):	0.00
Front Brake Dia.(mm):	324.82	LF Drum Dia. RESET(mm):	0.00
Fr Disc Thickness(mm):	29.13	RF Drum Dia. RESET(mm):	0.00
Lining Construction:	Bonded		

FRONT BRAKE COMPONENT DIMENSIONS AND CODES:

	Inboard (Leading)	Outboard (Trailing)
Width(mm):	47.68	47.73
Length(mm):	129.82	130.48
Thickness(mm):	9.37	9.37
Lining Code/Color:	AK NS308H FF	AK NS308H FF
Hyd. Piston Dia.(mm):	47.93	

PLOTS\INTRODSETUP + SETUPS\2010\

DATA SHEET 1 - (CONTINUED)

REAR SYSTEM BRAKE COMPONENT MATERIALS AND CONSTRUCTION:

BRAKE TYPE: DISC
Drum Construction: N/A
Disc Construction: INT.CAST, VENT
Lining Construction: BONDED
Rear Brake Dia.(mm): 330.91
Rr Disc Thickness(mm): 20.12

Material: CAST IRON
LR Drum Shoe Cage Dia.(mm): 0.00
RR Drum Shoe Cage Dia.(mm): 0.00
LR Drum Dia. RESET(mm): 0.00
RR Drum Dia. RESET(mm): 0.00

REAR BRAKE COMPONENT DIMENSIONS AND CODES:

Inboard (Leading)
Width(mm): 39.83
Length(mm): 113.16
Thickness(mm): 10.74
Lining Code/Color: AK NS265H FF
Hyd Piston Dia (mm): 48.03

Outboard (Trailing)
Width (mm): 39.83
Length (mm): 113.11
Thickness (mm): 10.67
Lining Code/Color: AK NS265H FF

OTHER COMPONENT INFORMATION:

Friction-type Park Brake: N/A
Non-Service Brake Type
Parking Brake: FOOT-OPERATED

NOTE: If at any time after the test series has begun, any brake system part requires replacement or the brake system requires adjustments other than permitted in burnish and reburnish procedures, discontinue testing and notify the COTR immediately.

Technician: Karen Easterday KAREN EASTERDAY Date: 12-12-07

Quality Assurance: Randy Landes RANDY LANDES

VEHICLE: 2008 Saturn Outlook FWD XE NHTSA NO.: C80101 DATE: 12/11/07

3.0 SUMMARY OF TESTING

		Specification and Limit				TEST RESULTS (In compliance if one stop meets requirement)			
TEST	Loading Condition	Speed (km/h)	Min. Pedal Force (N)	Max. Pedal Force (N)	Stopping Distance Requirement (m)	Shortest Stop Min. Pedal Force (N)***	Shortest Stop Max. Pedal Force Newtons (Average – N)	Shortest Stop Stopping Distance (m) (Corrected)	PASS Fail
Equipment Requirements					Specified Equipment	Vehicle contains specified equipment			Pass
Vehicle Maximum Speed	LLVW	NA				177.5 km/h avg.			NA
Burnish	GVWR	80				200, 80 - 0 km/h stops @ 3.0 mpsps			NA
Wheel Lockup Sequence w/o ABS	GVWR				Lockup of front wheels prior to rear	ABS equipped – not required.			NA
Wheel Lockup Sequence w/o ABS	LLVW					ABS equipped – not required.			NA
Adhesion Utilization w/o ABS	LLVW				Rear axle adhesion utilization curve below specified value	ABS equipped – not required.			NA
Adhesion Utilization w/o ABS	GVWR					ABS equipped – not required.			NA
Cold Effectiveness	GVWR	100	65	500	70	5	476.6	51.8	Pass
High Speed Effectiveness	GVWR	142.0	65	500	spd. depend. – 149.3	5	485.3	99.4	Pass
Stops with Engine Off	GVWR	100	65	500	70	5	432.6	53.8	Pass
Cold Effectiveness	LLVW	100	65	500	70	5	479.3	46.5	Pass
High Speed Effectiveness	LLVW	142.0	65	500	spd. depend. – 149.3	5	472.3	96.2	Pass
Failed Antilock	LLVW	100	65	500	85	5	162.4	57.2	Pass
Failed Proportioning Valve	LLVW	100	65	500	110	5	NA	NA	NA
Failed Hydraulic Circuit #1	LLVW	100	65	500	168	5	453.8	72.3	Pass
Failed Hydraulic Circuit #2	LLVW	100	65	500	168	5	474.9	89.3	Pass
Failed Hydraulic Circuit #1	GVWR	100	65	500	168	5	469.5	98.8	Pass
Failed Hydraulic Circuit #2	GVWR	100	65	500	168	5	462.3	105.5	Pass
Failed Antilock	GVWR	100	65	500	85	5	191.9	62.5	Pass
Failed Proportioning Valve	GVWR	100	65	500	110	5	NA	NA	NA
Regenerative Brake System (RBS) Failure	GVWR	100	65	500	168	5	NA	NA	NA
Electromotive Force (EMF) – Battery Failure	GVWR	100	65	500	70	5	NA	NA	NA
Power Brake Unit Failure	GVWR	100	65	500	168	5	490.4	160.9	Pass
Parking Brake - Uphill	GVWR	-	-	500	Hold for 5 min.?	NA	488.2 {Prk Br]	Yes-Holds	Pass
Parking Brake - Downhill	GVWR	-	-	500	Hold for 5 min.?	NA	481.3 [Prk Br]	Yes-Holds	Pass
Heating Snubs	GVWR	120-	NA	NA	15 Snubs- 3.0 mpsps	5	40 Vis. Avg.	NA	NA
Hot Performance Stop #1	GVWR	100	65	325 **avg**	79.0	5	332.4 (269.8)	52.0	Pass
Hot Performance Stop #2	GVWR	100	65	500	89	5	429.0 (316.2)	48.8	Pass
Brake Cooling	GVWR	50	NA	NA	4 Stops - 3.0 mpsps	5	36 Vis. Avg.	NA	NA
Recovery Performance Stop #1	GVWR	100	65	325 **avg**	One of the two stops between 37.6 and 69.2 meters.	5	322.1 (212.7)	48.2	Pass
Recovery Performance Stop #2	GVWR	100	65	325 **avg**		5	430.7 (267.8)	46.7	
Final Inspection-Brake Integrity	Check components for detachment, fracture or lubricants.					No detachments or fractures-normal appear. & colr.			Pass
Final Inspection- Reservoirs/Warning Indicators	Master cylinder or brake power reservoir shall meet the volume and label requirements of S5.4.2 and S5.4.3.					Brake system has sufficient capacity and indicators are in compliance.			Pass

*** Note: The Shortest Stop Minimum Pedal Force represents the minimum force value required to engage the data acquisition's recording mode.

DATA SHEET 3 - VEHICLE WEIGHT

VEHICLE: 2008 SATURN OUTLOOK FWD XE NHTSA No. C80101 Date: 10/29/07

Tire Pressure(cold): Front (kpa) 241 Rear (kpa) 241
Odometer: Start 29 MI. End 511 MI.
Scale(s) Used: TRC Scales

NOTE: GVWR, LLVW and axle weights to be measured within +0% and -1%.

GVWR/GAWR INFORMATION
(From Veh. Certification Label)

GVWR(Kg): 2908
GAWR Front(Kg): 1450
GAWR Rear(Kg): 1600

UNLOADED VEHICLE WEIGHT(UVW)

L Front(Kg): 597 L Rear(Kg): 466
R Front(Kg): 599 R Rear(Kg): 456
T Front(Kg): 1196 T Rear(Kg): 922
Total UVW(Kg): 2118

TARGET LIGHT LOADED WEIGHT(LLVW):

NOTE 1: LLVW = UVW+181.4Kg
NOTE 2: Weight distributed in front passenger seat area.
NOTE 3: Neither axle load at LLVW less than at UVW; ballast as required.

L Front(Kg): 648 L Rear(Kg): 506
R Front(Kg): 652 R Rear(Kg): 496
T Front(Kg): 1300 T Rear(Kg): 1002
Total LLVW(Kg): 2302

ACTUAL LIGHT LOADED WEIGHT(LLVW):

L Front(Kg): 652 L Rear(Kg): 509
R Front(Kg): 647 R Rear(Kg): 492
T Front(Kg): 1299 T Rear(Kg): 1001
Total Actual Test LLVW(Kg): 2300

Load: Driver/Observer 73(Kg) + Instru.41(Kg) + Ballast 68(Kg) = 181(Kg)

FULLY LOADED TEST WEIGHT (ACTUAL GVWR)

NOTE 1: Vehicle loaded so axle loads proportional to GAWR shown previously.
NOTE 2: But no axle weight to be less than at LLVW.
NOTE 3: If weight on any axle at LLVW exceeds the axle's proportional share of the GVWR, the load required to reach GVWR is placed so that the weight on that axle remains the same as at LLVW.

L Front(Kg): 688 L Rear(Kg): 770
R Front(Kg): 694 R Rear(Kg): 755
T Front(Kg): 1382 T Rear(Kg): 1525
Total Fully Loaded GVWR(Kg): 2907

Load: Driver/Observer 73(Kg) + Instru. 41(Kg) + Ballast 675(Kg)= 788(kg)

Technician: Karen Easterday Date: 12-12-07
KAREN EASTERDAY

Quality Assurance: Randy Landes
RANDY LANDES

DATA SHEET 4 - EQUIPMENT REQUIREMENTS (S5)

SERVICE BRAKE SYSTEM (S5.1)

Vehicle equipped with a service brake system acting on all wheels? YES

Wear Adjustment (S5.1.1):
Service Brakes are compensated for wear by means of a system of automatic adjustment? YES
Describe: DISC-AUTOMATIC CLEARANCE TAKE-UP.

Wear Status (S5.1.2):
Wear status of service brakes is indicated by:
(A) Acoustic or optical device? YES
Describe: METAL TAB EMITS HIGH FREQUENCY SQUEAL WHEN WORN.
(B) Visual check outside or under vehicle? YES
Describe: FRONT & REAR:LOOK THROUGH CALIPER.

PARKING BRAKE SYSTEM (S5.2)

Vehicle equipped with a parking brake system of a friction type with solely mechanical means to retain engagement: YES

CONTROLS (S5.3)

(A) Service brakes activated by means of a foot control? YES
(B) Parking brake control is independent of the service brake control? YES
(C) Parking brake control is hand or foot operated? YES
(D) ABS, if equipped, cannot be manually disabled? YES

DATA INDICATES COMPLIANCE: YES

COMMENTS: NONE.

Tester/Technician: Karen Easterday KAREN EASTERDAY Date: 12-12-07

Quality Assurance: RANDY LANDES

DATA SHEET 5 - VEHICLE MAX SPEED

VEHICLE: 2008 SATURN OUTLOOK FWD XE NHTSA No. C80101 Date: 10/29/07

Ambient Temperature: 41°F Wind Velocity: 5(MPH)
Road PFC: 1.01 Wind Direction: 148°
Odometer: Start 45(mi) End 60(mi)

TEST WEIGHT: Total (Kg): 2300 Front (Kg): 1299 Rear (Kg): 1001

ESTABLISH VEHICLE MAXIMUM SPEED

VEHICLE LOAD: LLVW IBT: N/A
GEAR: Drive DECEL RATE: N/A
PEDAL FORCE: N/A WHEEL LOCKUP: N/A
TEST SPEED: Maximum attainable from a standing start in 3.2 km. INTERVAL: N/A

1. Ballast Vehicle to LLVW
2. Accelerate at a maximum rate from a standing start for a distance of 3.2 km on a level surface.
3. Repeat in opposite direction.
4. Record speed attained in each direction and use the average of the two runs.

	DIRECTION	MAX SPEED (km/h)		Time 0 - 100 KPH (seconds)
		Visual	Recorded	
Run No. 1	South	177 kph	177.1	8.97
Run No. 2	North	177 kph	177.9	9.23

AVERAGE = 177.5 km/h

COMMENTS: INV DATA, Section 0001, 10/30/07, 09:36:48

Tester/Technician: Karen Easterday KAREN EASTERDAY Date: 12-12-07

Quality Assurance: Randy Landes RANDY LANDES

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

Transportation Research Center, Inc.
10820 State Route 347
East Liberty, Ohio 43319
(937)666-2011 www.trcpg.com

Date Tested: 10/30/07

DATA SHEET 6 - BURNISH AT GVWR

Testing Conditions: INV DATA, Section 0002, 10/30/07, 13:32:49

Weather Conditions: 53°F Wind: 3 mph 166° Start Odo.: 62 End Odo.: 316

Schedule:
Initial Brake Temperature Less Than 100°C
Initial Speed 80 km/h to zero
200 stops with transmission in gear

Performance Requirements:
Interval between runs: Time necessary to reduce IBT to 100 C° or 2 km distance, whichever occurs first.
Constant decel rate: 3.0 m/s^2
Pedal force adjusted to maintain constant decel.
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	AVG. DECEL (m/sec^2)
1	79.75	36	36	33	33	73.83	47.95	2.85
10	79.34	104	111	113	107	63.36	41.03	2.96
20	79.68	97	111	118	111	46.47	33.44	2.84
30	80.23	94	112	126	106	48.73	34.89	2.82
40	80.31	99	111	131	114	49.55	30.14	2.77
50	79.83	92	98	114	98	54.35	33.05	2.90
60	79.55	94	110	133	105	56.81	36.45	2.83
70	79.52	99	113	135	106	43.17	29.01	2.65
80	80.52	101	114	139	116	58.73	33.12	2.81
90	79.61	97	114	137	116	54.23	32.46	2.83
100	80.53	94	114	140	113	54.08	31.50	2.77
110	79.89	96	111	138	118	58.02	33.66	2.84
120	79.82	91	108	138	117	66.24	37.26	2.83
130	79.24	91	104	139	116	53.98	28.61	2.88
140	80.39	91	101	138	117	50.73	30.12	2.85
150	79.21	91	101	138	118	75.01	33.00	2.92
160	80.00	88	98	136	116	65.11	33.47	3.12
170	80.83	88	98	135	116	70.21	30.95	2.96
180	79.70	85	94	133	115	56.93	33.61	2.83
190	79.92	83	92	132	114	52.53	28.69	2.83
200	80.32	82	93	132	114	48.12	32.65	2.78

COMMENTS: THIS VEHICLE ABS EQUIPPED. DATA SHEETS 7-10 NOT INCLUDED.

BRAKE ADJUSTMENT

Schedule:
Adjust service brakes; record procedure and amount adjusted.

Left Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED
Right Front: DISC DISC BRAKE NO ADJUSTMENT REQUIRED
Left Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.
Right Rear: DISC DISC BRAKE NO ADJUSTMENT REQUIRED.
DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 10/31/07

DATA SHEET 11 - COLD EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0015, 10/31/07, 13:31:54

Weather Conditions: 61°F Wind: 17 mph 209° Start Odo.: 334 End Odo.: 340

Schedule:
Initial Brake Temperature 65 - 100 C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than 70m
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.97	69	73	67	76	52.0	51.0	294.59	187.45	12.65	5.92
2	100.90	86	83	74	74	51.3	50.4	569.83	352.02	16.86	6.04
3	99.56	92	88	73	69	51.6	52.1	458.62	314.86	16.24	6.13
4	100.16	92	88	72	64	52.0	51.8	504.13	338.50	15.88	5.87
5	99.56	77	69	54	47	51.7	52.2	472.81	358.96	13.60	6.73
6	99.65	81	74	62	52	51.4	51.8	476.63	325.25	12.43	5.95

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

Corrected Distances are used to determine shortest stopping distance.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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(937)666-2011 www.trcpg.com

Date Tested: 10/31/07

DATA SHEET 12 - HIGH SPEED EFFECTIVENESS AT GVWR

Testing Conditions: INV DATA, Section 0020, 10/31/07, 14:34:13

Weather Conditions: 63°F Wind: 20 mph 217° Start Odo: 342 End Odo: 357

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed: 80% max km/h, not greater than 160km/h
6 stops with transmission in gear
Target Initial Speed: 142.02 kph

Performance Requirements:
One Stop with:
Stopping Distance less than: **149.3 meter**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	139.43	93	87	86	75	103.2	107.0	465.42	361.45	13.64	7.05
2	141.38	92	79	71	59	100.0	100.9	468.25	342.34	16.60	6.89
3	142.67	80	61	54	42	100.3	99.4	485.32	366.11	12.83	6.97
4	140.56	91	72	66	52	112.1	114.4	276.03	202.96	12.36	6.71
5	141.34	88	70	63	49	108.1	109.1	407.18	237.02	13.97	6.63
6	139.92	91	71	63	51	103.0	106.1	398.71	228.23	15.45	7.25

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/01/07

DATA SHEET 13 - STOPS WITH ENGINE OFF AT GVWR

Testing Conditions: INV DATA, Section 0025, 11/01/07, 09:33:02

Weather Conditions: 45°F Wind: 8 mph 288° Start Odo.: 376 End Odo.: 382

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than 70m
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	99.89	71	71	61	69	68.6	68.7	222.32	152.14	10.20	5.37
2	100.76	93	88	74	81	59.2	58.3	357.81	223.43	11.90	6.33
3	100.97	97	92	66	74	55.5	54.4	370.81	246.03	10.75	6.47
4	100.57	81	77	49	54	54.4	53.8	423.61	280.41	11.21	6.19
5	100.57	98	92	62	67	54.6	54.0	378.27	251.67	11.53	6.65
6	99.90	97	92	56	63	55.9	56.1	463.25	302.82	10.45	6.30

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH YES
2	-	NOX	SOUTH YES
3	-	NOX	SOUTH YES
4	-	NOX	SOUTH YES
5	-	NOX	SOUTH YES
6	-	NOX	SOUTH YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/01/07

DATA SHEET 14 - COLD EFFECTIVENESS AT LLVW

Testing Conditions: INV DATA, Section 0030, 11/01/07, 13:26:17

Weather Conditions: 50°F Wind: 12 mph 325° Start Odo.: 385 End Odo.: 391

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than **70m**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	98.98	76	74	64	67	48.9	49.9	455.89	309.91	13.59	7.11
2	99.57	95	89	64	66	48.1	48.5	461.36	325.38	12.91	7.18
3	99.69	77	74	40	42	47.8	48.1	458.57	315.21	13.00	6.91
4	100.29	91	88	49	53	48.5	48.2	428.93	330.25	12.45	7.20
5	100.70	83	83	39	44	47.2	46.5	479.33	358.05	13.66	7.54
6	99.67	95	94	48	52	48.3	48.6	459.24	328.68	11.86	7.20

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/01/07

DATA SHEET 15 - HIGH SPEED EFFECTIVENESS AT LLVW

Testing Conditions: INV DATA, Section 0035, 11/01/07, 14:23:36

Weather Conditions: 52°F Wind: 9 mph 294° Start Odo.: 393 End Odo.: 402

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed: 80% max km/h
6 stops with transmission in gear

Performance Requirements:
One Stop with:
Stopping Distance less than 149.3m
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	140.81	79	81	41	42	95.0	96.6	485.93	367.76	15.68	7.45
2	140.84	78	78	38	41	95.2	96.8	464.61	379.53	12.46	7.76
3	141.64	89	88	44	43	96.6	97.1	466.58	355.20	14.22	7.45
4	141.85	93	84	47	44	96.9	97.1	497.06	384.70	14.06	7.46
5	143.44	79	76	42	38	98.2	96.3	480.76	367.85	12.89	7.48
6	143.10	78	77	41	40	97.6	96.2	472.32	364.92	14.00	7.36

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/02/07

DATA SHEET 16 - ANTILOCK FUNCTIONAL FAILURE AT LLVW

Testing Conditions: INV DATA, Section 0040, 11/02/07, 09:49:42

Weather Conditions: 42°F Wind: 4 mph 126° Start Odo.: 411 End Odo.: 416

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than 85m
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.43	74	75	58	57	57.7	57.2	162.40	105.30	8.91	6.26
2	99.87	90	88	65	64	66.3	66.4	132.21	94.32	8.83	5.65
3	99.59	77	78	48	51	58.2	58.7	138.17	97.07	9.01	6.26
4	99.14	87	87	54	54	69.2	70.4	120.94	92.44	8.44	5.43
5	99.18	92	89	54	56	60.3	61.3	128.72	102.93	8.86	6.11
6	98.97	76	78	46	47	58.8	60.0	136.67	94.02	8.25	6.10

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

How was the ABS failure induced: REMOVED 40 AMP FUSE FROM FUSEBOX UNDER RIGHT SIDE OF HOOD.

Is brake system indicator lamp activated: YES (X) NO ( )

Vehicle not equipped with separate variable proportioning valve. Data Sheet 17 not included.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/05/07

DATA SHEET 18 - HYDRAULIC CIRCUIT FAILURE #1 AT LLVW

Testing Conditions: INV DATA, Section 0050, 11/05/07, 11:41:46

Weather Conditions: 57°F Wind: 23 mph 185° Start Odo.: 423 End Odo.: 427

Method of simulating failure: Disconnected Brake Line @ M/C Front Port

System Portion Failed: RF & LR

Schedule:
Initial Brake Temperature: 65-100°C
Initial Speed 100 km/h to zero
4 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than **168m**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	98.95	79	18	21	62	77.3	79.0	432.52	308.09	9.42	5.00
2	99.07	93	29	22	54	71.0	72.3	453.75	371.25	6.71	5.84
3	99.77	98	36	22	52	79.8	80.2	519.30	322.08	11.15	5.17
4	99.21	91	36	22	44	81.4	82.7	371.11	267.95	9.15	5.10

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

Force Needed to Activate Brake Failure Lamp (N): N/A
Fluid Removed (mL) to Activate Brake Failure Lamp: 320

Is brake system indicator lamp activated: YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/05/07

DATA SHEET 19 - HYDRAULIC CIRCUIT FAILURE #2 AT LLVW

Testing Conditions: INV DATA, Section 0055, 11/05/07, 12:58:22

Weather Conditions: 59°F Wind: 30 mph 195° Start Odo.: 430 End Odo.: 435

Method of simulating failure: Disconnected Brake Line @ M/C Rear Port

System Portion Failed: LF & RR

Schedule:
Initial Brake Temperature 65-100°C
Initial Speed 100 km/h to zero
4 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than 168m
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.38	32	74	66	26	102.0	101.2	443.13	324.22	6.43	3.86
2	100.04	29	85	70	24	98.5	98.4	464.41	318.65	6.09	4.04
3	99.22	24	92	69	24	87.9	89.3	474.88	391.40	8.94	4.12
4	98.41	24	90	75	23	91.1	94.0	483.62	411.42	7.78	4.13

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

Force Needed to Activate Brake Failure Lamp (N): N/A
Fluid Removed (mL) to Activate Brake Failure Lamp: 320

Is brake system indicator lamp activated: YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/05/07

DATA SHEET 20 - HYDRAULIC CIRCUIT FAILURE #1 AT GVWR

Testing Conditions: INV DATA, Section 0060, 11/05/07, 16:19:03

Weather Conditions: 62°F Wind: 16 mph 240° Start Odo.: 445 End Odo.: 450

Method of simulating failure: Disconnected Brake Line @ M/C Front Port

System Portion Failed: RF & LR

Schedule:
Initial Brake Temperature 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than **168m**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.09	86	33	33	81	117.6	117.4	479.60	426.98	4.43	3.27
2	98.61	89	32	29	60	96.1	98.8	469.48	409.67	6.42	4.01
3	100.67	92	30	30	57	112.1	110.6	402.38	310.26	5.44	3.65
4	100.23	92	28	27	52	105.5	105.0	465.86	335.89	5.27	3.75

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

Is brake system indicator lamp activated: YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/05/07

DATA SHEET 21 - HYDRAULIC CIRCUIT FAILURE #2 AT GVWR

Testing Conditions: INV DATA, Section 0065, 11/05/07, 14:46:27

Weather Conditions: 61°F Wind: 29 mph 221° Start Odo.: 437 End Odo.: 442

Method of simulating failure: Disconnected Brake Line @ M/C Rear Port

System Portion Failed: LF & RR

Schedule:
- Initial Brake Temperature 65-100°C
- Initial Speed 100 km/h to zero
- 4 stops with transmission in neutral

Performance Requirements:
- One Stop with:
- Stopping Distance less than **168m**
- Pedal force between 65N and 500N
- No Lock-Up allowed longer than 0.1 sec above 15 km/h
- Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec^2)	AVG. DECEL (m/sec^2)
1	101.52	25	72	59	24	108.7	105.5	462.29	365.02	5.08	3.63
2	101.26	25	92	80	24	110.8	108.0	402.67	289.57	5.11	3.50
3	99.87	26	91	82	23	105.5	105.7	449.17	367.04	6.36	3.55
4	100.45	27	88	82	23	103.0	102.1	500.93	438.16	5.78	3.58

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES

Is brake system indicator lamp activated: YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO (R)

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 22 - ANTILOCK FUNCTIONAL FAILURE AT GVWR

Testing Conditions: INV DATA, Section 0070, 11/06/07, 11:30:50

Weather Conditions: 38°F Wind: 22 mph 264° Start Odo.: 459 End Odo.: 469

Schedule:
Initial Brake Temperature 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than **85m**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	99.51	74	66	66	62	81.2	82.0	157.32	119.17	8.25	4.94
2	100.64	83	71	67	62	79.2	78.1	148.70	115.70	8.88	4.95
3	100.79	91	77	69	64	64.9	63.8	212.81	160.62	8.41	5.90
4	101.40	91	75	64	56	64.2	62.5	191.90	151.53	8.59	5.84
5	100.81	91	76	62	53	65.2	64.2	202.91	152.35	8.42	5.50
6	99.84	68	61	51	48	62.4	62.6	182.39	149.79	9.11	5.91

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)		
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

How was the ABS failure induced: REMOVED 40 AMP FUSE FROM FUSEBOX UNDER RIGHT SIDE OF HOOD.

Is brake system indicator lamp activated: YES (X) NO ( )

Vehicle not equipped with separate variable proportioning valve. Data Sheet 23 not included.

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 24 - BRAKE POWER UNIT OR PWR ASSIST UNIT IN/OP AT GVWR

Testing Conditions: INV DATA, Section 0080, 11/06/07, 12:13:44

Weather Conditions: 39°F Wind: 20 mph 269° Start Odo.: 469 End Odo.: 477

Failure Simulation: Disconnect primary source of power.

Method of rendering inoperative: Removed Engine Vacuum Hose at Booster

Schedule:
Initial Brake Temperature 65-100°C
Initial Speed 100 km/h to zero
6 stops with transmission in neutral

Performance Requirements:
One Stop with:
Stopping Distance less than **168m**
Pedal force between 65N and 500N
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec^2)	AVG. DECEL (m/sec^2)
1	101.00	80	71	59	54	185.8	182.1	499.57	437.98	3.80	2.19
2	99.46	78	68	62	58	177.1	179.0	493.10	464.26	2.99	2.31
3	99.22	83	72	66	62	176.7	179.5	502.87	464.36	3.65	2.24
4	100.16	88	76	73	64	161.4	160.9	490.44	463.22	2.99	2.31
5	99.95	87	75	68	70	167.7	167.8	496.45	465.93	3.12	2.41
6	100.41	83	69	63	60	165.8	164.5	509.52	468.69	3.19	2.39

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES
3	-	NOX	SOUTH	YES
4	-	NOX	NORTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES

Is the brake system indicator lamp activated: YES ( ) NO (X)

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 25 - PARKING BRAKE AT GVWR

Testing Conditions: INV DATA, Section 0085, 11/06/07, 14:25:24
Parking brake: AUTOMATIC TR Non-service type: FOOT-OPERATED Service type: N/A

Weather Conditions: 39°F Wind: 24 mph 288° Start Odo.: 482 End Odo.: 482

Test Weight: Total:2907kg Front:1382kg Rear:1525kg

Schedule:
Initial Brake Temperature <100°C or (Ambient temp. if non-service brake type materials)
Loaded to GVWR with transmission in neutral
Drive onto 20% slope in forward and reverse directions.

Performance Requirements:
Up to Three Applies in each direction:
Parking brake must hold the vehicle stationary in both directions for 5 minutes each.
Pedal force: Hand control: <400 N
Foot control: <500 N

NOTE: For vehicles with parking brake systems not utilizing the service brake friction elements, the friction elements of such systems are to be burnished prior to parking brake tests according to the manufacturer's published recommendation as furnished to the purchaser. If no recommendations are furnished, test the system in an unburnished condition. If recommendations are furnished, record method used.

APPLY #	MAX SERVICE FORCE (N)	MAX P-BRAKE FORCE (N)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	AVG REAR IBT (°C)	DRIVER VEHICLE STOP COMMENTS (Direction of Stop (Up/Down) - Brake holds/fails)
1	64.9	488.2	26	27	26.1	- 0 REAPPLY UPHILL HOLDS 20%
2	81.9	481.3	21	23	21.9	- 0 REAPPLY DOWNHILL HOLDS 20%

Is brake system indicator lamp activated: YES (X) NO ( )

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 26 - HEATING SNUBS AT GVWR

Testing Conditions: INV DATA, Section 0090, 11/06/07, 15:16:59

Schedule:
Conduct 15 snubs from 120 Km/h or 80% Vmax, whichever is slower, to 1/2 of initial speed.
Attain required decel in 1 second and maintain that decel.
Interval between snubs is 45 seconds and WOT to initial speed.

Performance Requirements:
Initial IBT for first snub is 55-65°C
Maintain 3.0 m/s/s deceleration
Vehicle Must stay in lane of 3.5m

SNUB #	AVG. DECEL (m/sec^2)	Time Between Snubs (second)	AVG. PEDAL FORCE (N)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	INIT SPD (kph)
1	2.85	--NA--	42.40	54	54	49	48	119.59
2	2.91	47	38.85	93	88	87	87	119.84
3	2.76	45	35.45	134	123	126	122	120.07
4	2.81	45	38.73	166	153	159	150	120.59
5	2.80	45	40.38	188	180	188	174	120.68
6	2.83	45	37.86	206	199	215	193	120.78
7	2.87	45	37.74	222	218	238	215	120.21
8	2.89	44	41.84	231	227	257	232	120.94
9	2.86	46	40.75	239	236	273	249	121.09
10	2.90	45	40.97	249	243	282	264	119.79
11	2.88	44	40.08	258	247	289	278	121.05
12	2.82	45	41.71	264	253	300	289	120.48
13	2.94	46	39.49	274	264	312	301	121.35
14	2.83	45	41.61	278	277	322	304	121.05
15	3.10	45	46.10	281	285	331	308	119.81

STOP #	DRIVER VEHICLE SNUB COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	NORTH	YES
2	-	NOX	EAST	YES
3	-	NOX	EAST	YES
4	-	NOX	SOUTH	YES
5	-	NOX	SOUTH	YES
6	-	NOX	SOUTH	YES
7	-	NOX	WEST	YES
8	-	NOX	NORTH	YES
9	-	NOX	NORTH	YES
10	-	NOX	NORTH	YES
11	-	NOX	NORTH	YES
12	-	NOX	EAST	YES
13	-	NOX	SOUTH	YES
14	-	NOX	SOUTH	YES
15	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 27 - HOT PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 0095, 11/06/07, 15:27:58

Schedule:
Make 2 stops from 100 kph
Pedal Force: 1st stop is done with an average force less than the average recorded in the shortest GVWR Cold Effectiveness stop.
2nd stop is done with a force less than 500 N.
No Lock-Up allowed longer than 0.1 sec above 15 km/h.
Distance Requirements are based on the following:
shortest stop in Data Sheet 11 is: 6
Initial speed of stop: 99.65 (kph)
Actual distance of stop: 51.4 (meter)
Average pedal force: 325.2 (N)

Performance Requirements:
Stop Number 1 must be less than: **79.0 (meter)**
In addition the stopping distance for at least one of the of the two hot stops must be less than: **89 (meter)**

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.15	300	305	346	322	52.1	52.0	332.36	269.78	11.60	6.47
2	99.86	316	321	352	331	48.6	48.8	428.96	316.21	13.27	6.91

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	SMOKE	NOX	WEST	YES
2	SMOKE	NOX	WEST	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 28 - BRAKE COOLING STOPS AT GVWR

Testing Conditions: INV DATA, Section 0100, 11/06/07, 15:30:57

Schedule:
Initial Brake Temperature:
Achieved on completing Hot Performance
Initial Speed 50 km/h to zero
4 stops with transmission in gear

Performance Requirements:
Constant Decel rate: 3.0 m/s/s
Pedal force adjusted as necessary
No Lock-Up allowed longer than 0.1 sec above 15 km/h
Vehicle Must stay in lane of 3.5m

STOP #	INIT SPD (kph)	AVG. DECEL (m/sec^2)	AVG. PEDAL FORCE (N)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)
1	50.66	2.78	42.23	271	286	299	278
2	49.83	2.61	33.92	216	232	242	227
3	49.86	2.66	32.68	172	183	183	186
4	51.34	2.77	33.33	143	149	148	157

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock up - Direction of Stop - Stay in Lane)			
1	-	NOX	NORTH	YES
2	-	NOX	NORTH	YES
3	-	NOX	NORTH	YES
4	-	NOX	EAST	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

Vehicle: 2008 GENERAL MOTORS NHTSA NUMBER: C80101
Make: SATURN
Model: OUTLOOK FWD XE
Body Style: MPV
Front Cold Tire Pressure: 241 (Kpa)
Rear Cold Tire Pressure: 241 (Kpa)

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Date Tested: 11/06/07

DATA SHEET 29 - RECOVERY PERFORMANCE AT GVWR

Testing Conditions: INV DATA, Section 0105, 11/06/07, 15:38:25

Weather Conditions: 39°F Wind: 26 mph 272° Start Odo.: 484 End Odo.: 501

Schedule:
Make 2 stops from 100 kph
Pedal Force: Both stops are performed with an average force less than the average recorded in the shortest GVWR Cold Effectiveness stop.

Performance Requirements:
One of the two stops must be within the following limits:
Upper limit of corrected stopping distance: **69.2 (meter)**
Lower limit of corrected stopping distance: **37.6 (meter)**

No Lock-Up allowed longer than 0.1 sec above 15 km/h.
Distance Requirements are based on the following:
shortest stop in Data Sheet 11 is:Stop6
Initial speed of stop: 99.65 (kph)
Actual distance of stop: 51.4 (meter)
Average pedal force: 325.2 (N)

STOP #	INIT SPD (kph)	LEFT FRONT IBT (°C)	RIGHT FRONT IBT (°C)	LEFT REAR IBT (°C)	RIGHT REAR IBT (°C)	ACTUAL DISTANCE (meter)	CORRECTED DISTANCE (SAE 299) (meter)	MAX. PEDAL FORCE (N)	AVG. PEDAL FORCE (N)	MAX. DECEL (m/sec²)	AVG. DECEL (m/sec²)
1	100.58	131	137	139	143	48.8	48.2	322.13	212.73	16.01	7.05
2	100.07	156	166	151	161	46.7	46.7	430.73	267.83	15.92	6.69

STOP #	DRIVER VEHICLE STOP COMMENTS (Wheel Lock-Up - Direction of Stop - Stay in Lane)			
1	-	NOX	SOUTH	YES
2	-	NOX	SOUTH	YES

DATA INDICATES COMPLIANCE: YES (X) NO ( )

Driver: KAREN EASTERDAY Observer: DEREK BEVIS
Recorded Data Processed by: CHUCK JENKINS Date: 11/15/07
Approving Laboratory Official: RANDY LANDES Date: 12/10/07

DATA SHEET 30 (Part 1 of 5)
6.0 Test Completion Inspection (7.17)

VEHICLE: 2008 Saturn Outlook FWD XE NHTSA NO.: C80101 DATE: 11/08/07

System Integrity (S5.6)

Each vehicle shall meet the complete performance requirements of this standard without:
(a) Detachment or fracture of any component of the braking system such as brake springs and brake shoes or disc pad facings, other than minor cracks, that do not impair attachment of the friction facings. All mechanical components of the braking system shall be intact and functional. Friction facing tearout (complete detachment of lining) shall not exceed 10 percent of the lining on any single frictional element.
(b) Any visible brake fluid or lubricant on the friction surface of the brake or leakage at the master cylinder or brake power unit reservoir cover, seal, and filler openings.

Friction Material Condition: Primary/Inner		**Friction Material Condition: Secondary/Outer**	
LF	Normal Appearance & Color	LF	Normal Appearance & Color
RF	Normal Appearance & Color	RF	Normal Appearance & Color
LR	Normal Appearance & Color	LF	Normal Appearance & Color
RR	Normal Appearance & Color	RR	Normal Appearance & Color
Drum (or Rotor) Condition:		**Brake Fluid/Lubricant Inside Brakes:**	
LF	Normal Appearance & Color	LF	None
RF	Normal Appearance & Color	RF	None
LR	Normal Appearance & Color	LR	None
RR	Normal Appearance & Color	RR	None
Hydraulic Component Condition:		**Mechanical Component Condition:**	
LF	Good	Brk/Pedal	Good
RF	Good	Power Brk	Good
LR	Good	Stop/Lamp	Good
RR	Good	Linkage	Good
M/Cyl	Good	Other	NA

COMPLIANCE: Yes X No____
Comments: None.

Technician: K. Easterday

DATA SHEET 30 (Part 2 of 5)
TEST COMPLETION INSPECTION (S7.17)

VEHICLE: 2008 Saturn Outlook FWD XE; NHTSA NO.: C80101; GVWR: 2908 kg
MASTER CYLINDER RESERVOIR:

DATE	11/08/07	Requirements	Pass	Fail
Reservoir Compartments (S5.4.1)				
(1) Does master cylinder have a reservoir compartment for each brake subsystem?	***Yes***	Master cylinder shall have a reservoir compartment for each subsystem.	X	
	No			
(2) Does loss of fluid in one compartment result in complete loss from another compartment?	Yes	Loss of fluid from one compartment shall not cause complete loss from another compartment.	X	
	No			
Reservoir Capacity (S5.4.2)				
Shall conform to requirements (1) or (2), state units: (1) For reservoirs having completely separate compartments for each subsystem (two separate, independent reservoirs):				
Subsystem 1 Subsystem reservoir capacity		Each compartment (reservoir) shall have a minimum capacity equivalent to the fluid displacement resulting when all wheel cylinders or caliper pistons serviced by that independent compartment/reservoir moves from a new lining, fully retracted position to a fully worn, properly adjusted, fully applied position. **(Use Data Sheet 31 and Appendix 1A)**	NA	NA
Subsystem 1 Fluid displaced from new to worn lining				
Subsystem 2 Subsystem reservoir capacity			NA	NA
Subsystem 2 Fluid displaced from new to worn lining				
2) For reservoirs utilizing a portion of the reservoir for a common supply to two or more subsystems:				
Total minimum capacity for the entire master cylinder reservoir (includes individual compartment reservoirs)	580 ml	Shall have total minimum capacity for entire reservoir for displacement resulting from all subsystem wheel cylinders or caliper positions moving from new lining to full worn condition as above.	X	
Fluid displaced from new to worn linings (ALL linings) *Value calculated from Data Sheet 31	212.8 ml*			

Comments: None.

DATA SHEET 30 (Part 3 of 5)
TEST COMPLETION INSPECTION (S7.18)

VEHICLE: 2008 Saturn Outlook FWD XE; NHTSA NO.: C80101; GVWR: 2908 kg

MASTER CYLINDER RESERVOIR:

DATE	11/08/07	Requirements	Pass	Fail
Master Cylinder Piston Displacement(S5.4.2) [If Common Reservoir Supply - continued from previous page]				
Fluid displaced by three strokes of master cylinder piston for Subsystem No. 1.	31 ml	Individual partial compartments of reservoir shall **each** have a minimum of fluid equal to at least the volume displaced by the master cylinder piston servicing the subsystem during a full stroke of the piston. **NOTE:** Procedure uses three strokes to ensure an accurate measurement.		
Fluid displaced by three strokes of master cylinder piston for Secondary (Subsystem No. 2)	28 ml			
Fluid displaced per stroke, Subsystem No. 1.	10.3 ml			
Fluid displaced per stroke, Subsystem No. 2.	9.3 ml			
Fluid available in partial compartment Subsystem No. 1	98 ml		X	
Fluid available in partial compartment Subsystem No. 2	56 ml		X	
Brake Power Unit Reservoir (S5.4.2)				
Volume displaced in charging system piston or accumulator to normal operating pressure plus wheel cylinder or caliper piston displacement.		Shall have a capacity at least equal to fluid displacement required to charge the system pistons on accumulators to normal operating pressure plus displacement when wheel cylinders or caliper pistons move from new lining to full worn condition as above.	NA	
Reservoir Labeling (S5.4.3)				
Exact copy of reservoir label: On master cylinder reservoir cap: WARNING. CLEAN FILLER CAP BEFORE REMOVING. USE ONLY DOT 3 FLUID FROM A SEALED CONTAINER.		Label shall read: "Warning, clean filler cap before removing; use only * fluid from a sealed container". * Fluid type specified in 49 CFR 571.116	X	
Measure letter height	3.2 mm	Letters shall be at least 3.2 mm/ 0.125" high	X	
Describe label attachment method and location. Embossed on a vertical portion of the firewall's, plastic shroud, immediately above (and within 75 mm) the master cylinder's filler cap.		Lettering shall be permanently affixed, engraved or embossed and located so as to be visible by direct view either on or within 100 mm/3.94 inches of the brake fluid reservoir filler plug or cap.	X	
Does the lettering contrast with the background?	Yes ***No***	If label is not engraved or embossed, letters shall be of a color that contrasts with the background	NA	

Comments: None.

Technician: K. Easterday

DATA SHEET 30 (Part 4 of 5)
TEST COMPLETION INSPECTION (S7.18)

VEHICLE: 2008 Saturn Outlook FWD XE ; NHTSA NO.: C80101; DATE: 11/08/07

BRAKE SYSTEM WARNING INDICATOR (S5.5)

CONDITION	ANSWER	REQUIREMENTS	PASS	FAIL
Brake Systems Indicator Lamp Function Check (S5.5.2) (Bulb and systems check)				
Describe location of brake indicator lamp: Lower left quadrant of the instrument cluster.	NA	Shall be in front, and in clear view, of driver.	X	
Does lamp light with ignition (start) switch at ON/RUN?	Yes	Automatic activation when ignition switch is "on" when engine **not running**, or ignition between "on" and "start" if is manufacturer check position- OR -single manual action by driver	X	
Does lamp light with ignition between ON and Start?	No			
Brake check description in owner's manual?	Yes	Manufacturer shall explain the brake check function test procedure in the owner's manual.	X	
Brake System Warning Indicator ACTIVATION (S5.5.1) DURATION (S5.5.3) FUNCTION (S5.5.4)				
CONDITION	**Light ON?**	**REQUIREMENT**	**PASS**	**FAIL**
A. In event of hydraulic leak (1) On or before appearance of pressure differential of 218 psi (split system)	NA	When ignition (Start) switch is **ON**, lamp must light whenever (A), (B), (C), or (D) occurs. In addition, if service brake system is not a split system, audible warning must be activated when any condition in (A) exists. Visual warning indicator for non-split systems must be flashing.	X	
(2) If any reservoir falls below either "safe" level or 25% of capacity, whichever is greater. Values: 320 **ml** or cc.	Yes			
(3) On or before supply pressure to brake power unit falls to 50%	NA			
B. Electrical functional failure in an antilock or variable brake proportioning system.	Yes		X	
C. Application of the parking brake.	Yes			
D. Brake lining wear-out if optical warning.	NA			
E. *For a vehicle with electrically-actuated service brakes, failure of the source of electric power to the brakes or diminution of state of charge of the batteries.*	NA NA			
F. *For a vehicle with electric transmission of the service brake control signal, failure to a brake control circuit.*	NA			
G. *For an EV with RBS that is part of the service brake system failure of RBS.*	NA			
Must have Audible alarm if not split system and a condition in (a) above exists?	NA			
If condition (A) (2) above does not exist, then fluid reservoir must be **transparent** for fluid check without the need for reservoir to be opened? (S5.4.4)	NA			
Indicator lamps remain activated as long as condition exists - ignition "on", and engine on or off? _____ (S5.5.3 DURATION))	Yes			
Visual warning – continuous or flashing? Audible warning –continuous or flashing?	Yes-Cont. *Yes-Flsh			

Comments: *For the low fluid and ABS failure, "chimes" occur for approx. 10 secs.

Technician: K. Easterday

DATA SHEET 30 (Part 5 of 5)
TEST COMPLETION INSPECTION (S7.18)

VEHICLE: 2008 Saturn Outlook FWD XE; NHTSA NO.: C80101; DATE: 11/08/07

BRAKE SYSTEM WARNING INDICATOR LABELING (S5.5.5)

CONDITION AND REQUIREMENT	ANSWER NOTE: Standard requires that the answer to questions be YES	PASS	FAIL
Are visual indicators legible to driver in daylight and nighttime conditions when activated?	Yes	X	
Are visual indicator words 3.2 mm (.125") high minimum? Record Height: "Brake" – 3.2 mm; "ABS" – 3.2 mm.	Yes	X	
Visual indicator words and background contrasting colors, one of which is red. Record colors Letters –Red, Lens – Black	Yes	X	
If split system, is there one brake indicator? If yes, does it say the word "Brake"? (With two symbols below.)	Yes	X	
If not split system; is there a separate indicator for loss of fluid or fluid pressure? Does this indicator say "Stop-Brake Failure"? Are the letters block and not less than 6.4 mm (.25") in height? Record letter height_____	NA		
If separate indicator for: 1. Low brake fluid per S5.5.1(a)(1), does indicator say "Brake Fluid"? NOTE: not required for mineral oil system Record wording_____. 2. Gross pressure loss per S5.5.1(a)(2), does indicator say "Brake Pressure"? Record wording _____ 3. Electrical functional failure in antilock or variable proportioning system per S5.5.1(b), letters and background contrasting colors one of which is yellow? Record colors__Lens – Black, Letters – Yellow. Does indicator say "Antilock" or "ABS" or "Brake Proportioning"? Record wording_"ABS" within symbol. 4. Parking brake per S5.5.1(c), does indicator say "Park" or "Parking Brake"? Record wording _____ 5. Brake lining wear-out per S5.5.1(d), does indicator say "Brake Wear"? Record wording_____ 6. *If separate indicator for RBS, the letters and background shall be of contrasting colors, one of which is yellow. The indicator shall be labeled "RBS". RBS failure in a system which is part of the service brake system may also be indicated by a yellow lamp that also indicates "ABS" failure and displays the symbol "ABS/RBS." Record wording*:_____ 7. For any other function? If yes, Record_____NA_____	NA NA Yes Yes NA NA NA		

DATA INDICATES COMPLIANCE: YES__X___ NO_____

Comments: None.
Technician: K. Easterday

DATA SHEET 31 (Part 1 of 2)
CALCULATION OF MINIMUM RESERVOIR VOLUME REQUIREMENTS

VEHICLE: 2008 Saturn Outlook FWD XE; NHTSA NO.: C80101; DATE: 11/09/07

BRAKE		LINING		
LOCATION	**TYPE**	**DESCRIPTION**	**MINIMUM THICKNESS**	**THICKNESS TO FULLY WORN (1) mm***
Left Front	Drum	Leading	Pre-test 9.37 mm	0
		Primary	Post Test 8.76 mm	
		Inboard X	Δ 0.61 mm	
	Disc X	Trailing	Pre-test 9.37 mm	0
		Secondary	Post Test 8.89 mm	
		Outboard X	Δ 0.48 mm	
LINING CLEARANCE:	Diametrical (2): N/A	Inboard – Approx 0 mm.	Outboard – Approx 0 mm.	
WHEEL CYLINDER DIAMETER (3) N/A		CALIPER PISTON DIAMETER (3): 47.93 mm (x2 pistons).		
SHOE CAGE DIAMETER (4) N/A ; CENTER POINT OF BRAKE ASSY TO CENTER POINT OF W.C. N/A				
Right Rear	Drum	Leading	Pre-test 10.74 mm	0
		Primary	Post Test 10.44 mm	
		Inboard X	Δ 0.30 mm	
	Disc X	Trailing	Pre-test 10.67 mm	0
		Secondary	Post Test 10.41 mm	
		Outboard X	Δ 0.26 mm	
LINING CLEARANCE:	Diametrical (2) N/A	Inboard – Approx 0 mm.	Outboard – Approx 0 mm.	
WHEEL CYLINDER DIAMETER (3): NA mm		CALIPER PISTON DIAMETER (3): 48.03 mm (x1 piston).		
SHOE CAGE DIAMETER (4): NA mm		CENTER POINT OF BRAKE ASSY TO CENTER PT. OF W.C.: NA mm		
CIRCUIT #1 CONSISTS OF:	LF	LR – X	RF – X	RR
CIRCUIT #2 CONSISTS OF:	LF – X	LR	RF	RR – X
(1) MFRS. RECOMMENDATIONS – FRONT and REAR: NA mm. (2) REAR -NA mm FRONT – NA mm				
(2) DRUM BRAKES, MEASURED AT HORIZONTAL CENTERLINE: RR drum ID: NA mm.				
(3) MFRS. DATA: FRONT – NA mm, REAR – NA mm. (4) RESET POSITION: NA mm.				

Comments: No manufacturer's data provided. Zero mm "fully worn thickness" utilized as a default.

Technician: K. Easterday

DATA SHEET 31 – SECTION CONTINUED (Part 2 of 2)

Vehicle: 2008 Saturn Outlook FWD XE; NHTSA No.: C80101; Date: 12/11/07

Procedure and Example for Determining Master Cylinder Volume Requirement

The procedure followed for determining the minimum volume requirements is outlined in the example shown below. The required data is taken from the previous page.

DISC BRAKES

Volume Required, $V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times [\pi (D^2)]/4$, where –

- V_r = Volume required per wheel
- Δt = Change in thickness (average)
- i = Inboard
- o = Outboard
- D = Caliper cylinder diameter
- c = Average clearance

Using the above equations, the volume requirements for Subsystem No. 1 (LR, RR) and Subsystem No. 2 (RF, LR) were calculated utilizing measured and manufacturer's provided data to create the greatest displacement, as shown below:

Disc Brake: (Front)

$V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi D^2}{4}$

Δt_i = 9.37 mm

Δt_o = 9.37 mm

$t_{ic} + t_{oc}$ = 0 mm

D = 47.93 mm

$V_r = (9.37 + 0 + 9.37 + 0) \frac{\pi (47.93)^2}{4}$

$= 18.74 (1804.3)$

$= 33812.3 \text{ mm}^3 = 33.8 \text{ ml (x2 pistons)} = 67.6 \text{ ml}$

Disc Brake: (Rear)

$V_r = (\Delta t_i + t_{ic} + \Delta t_o + t_{oc}) \times \frac{\pi D^2}{4}$

Δt_i = 10.74 mm

Δt_o = 10.67 mm

$t_{ic} + t_{oc}$ = 0 mm

D = 48.03 mm

$V_r = (10.74 + 0 + 10.67 + 0) \frac{\pi (48.03)^2}{4}$

$= 21.41 (1811.8)$

$= 38791.1 \text{ mm}^3 = 38.8 \text{ ml}$

For System 1 (RF, LR)

$V_{r1} = 64624 \text{ mm}^3 + 38791 \text{ mm}^3 = 106416 \text{ mm}^3$

$V_{r1} = 106416 \text{ mm}^3 = (106.4 \text{ ml})$

For System 2 (LF, RR)

$V_{r2} = V_{r1}$

$V_{r2} = 106416 \text{ mm}^3 = (106.4 \text{ ml})$

TOTAL VOLUME REQUIRED = $V_t = V_{r1} + V_{r2} = 212832 \text{ mm}^3 = 212.8 \text{ ml}$*

Section 6.0

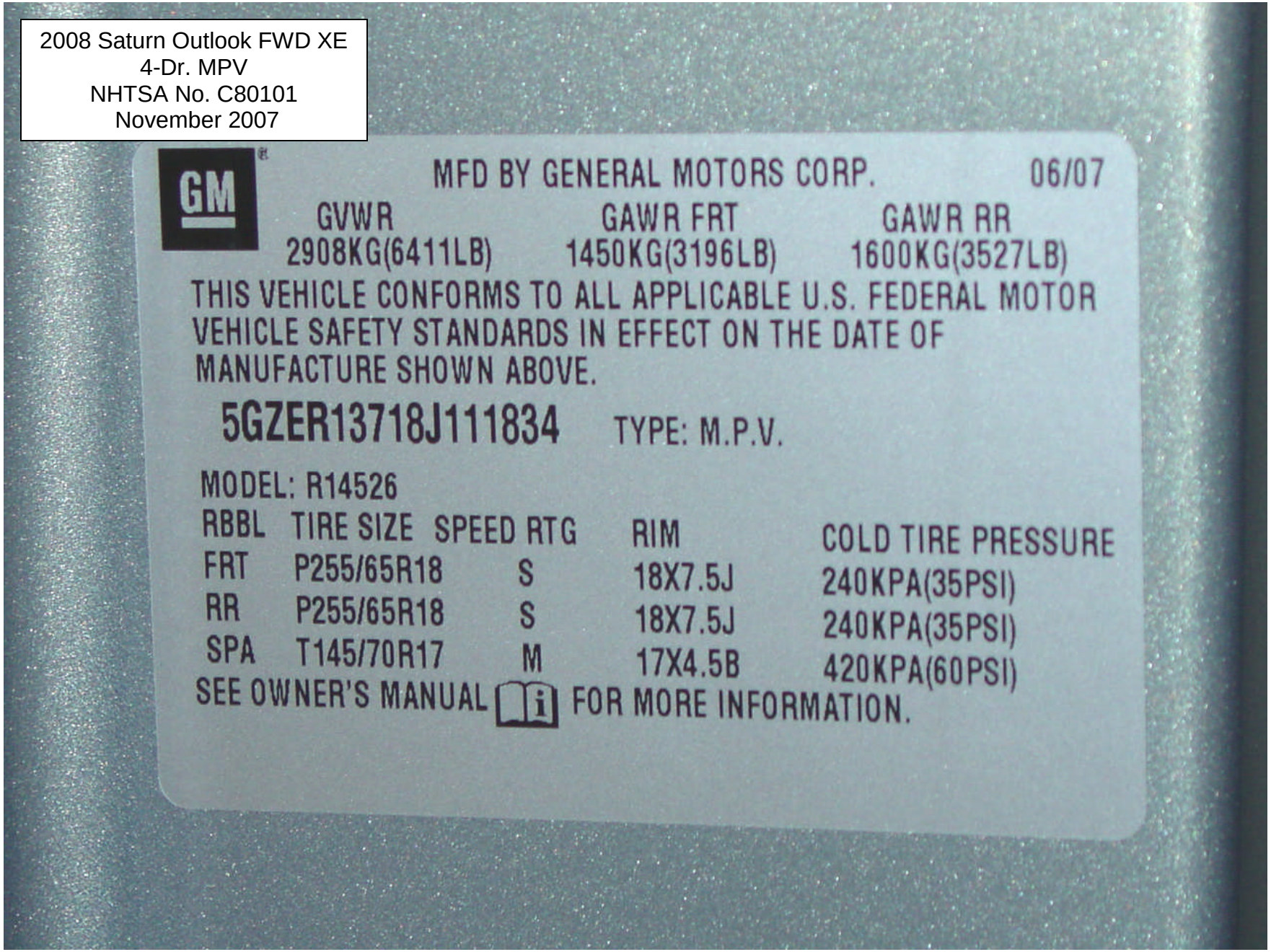
Photographs

2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

Left Front 3/4 View

Right Rear 3/4 View

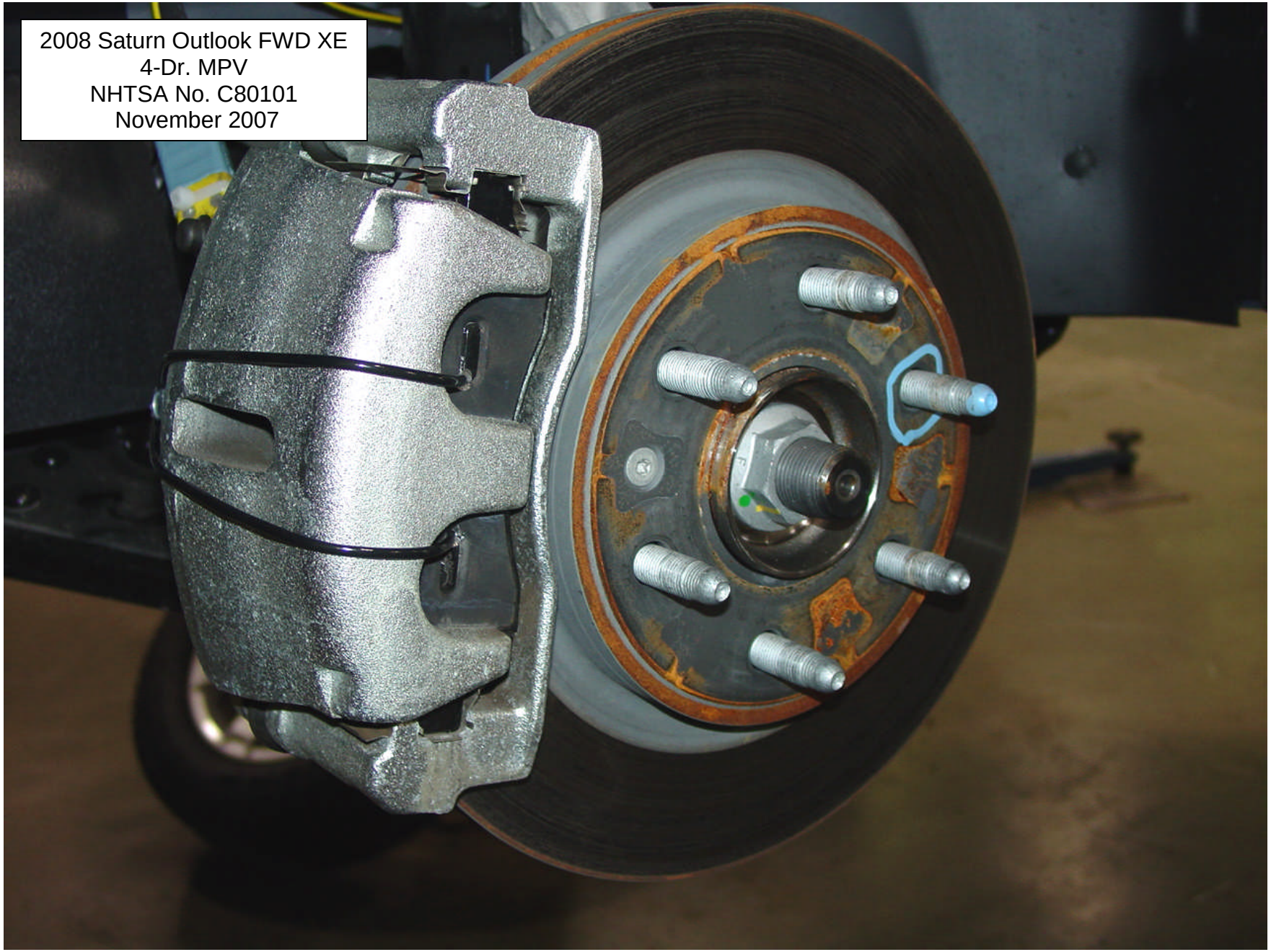
2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007



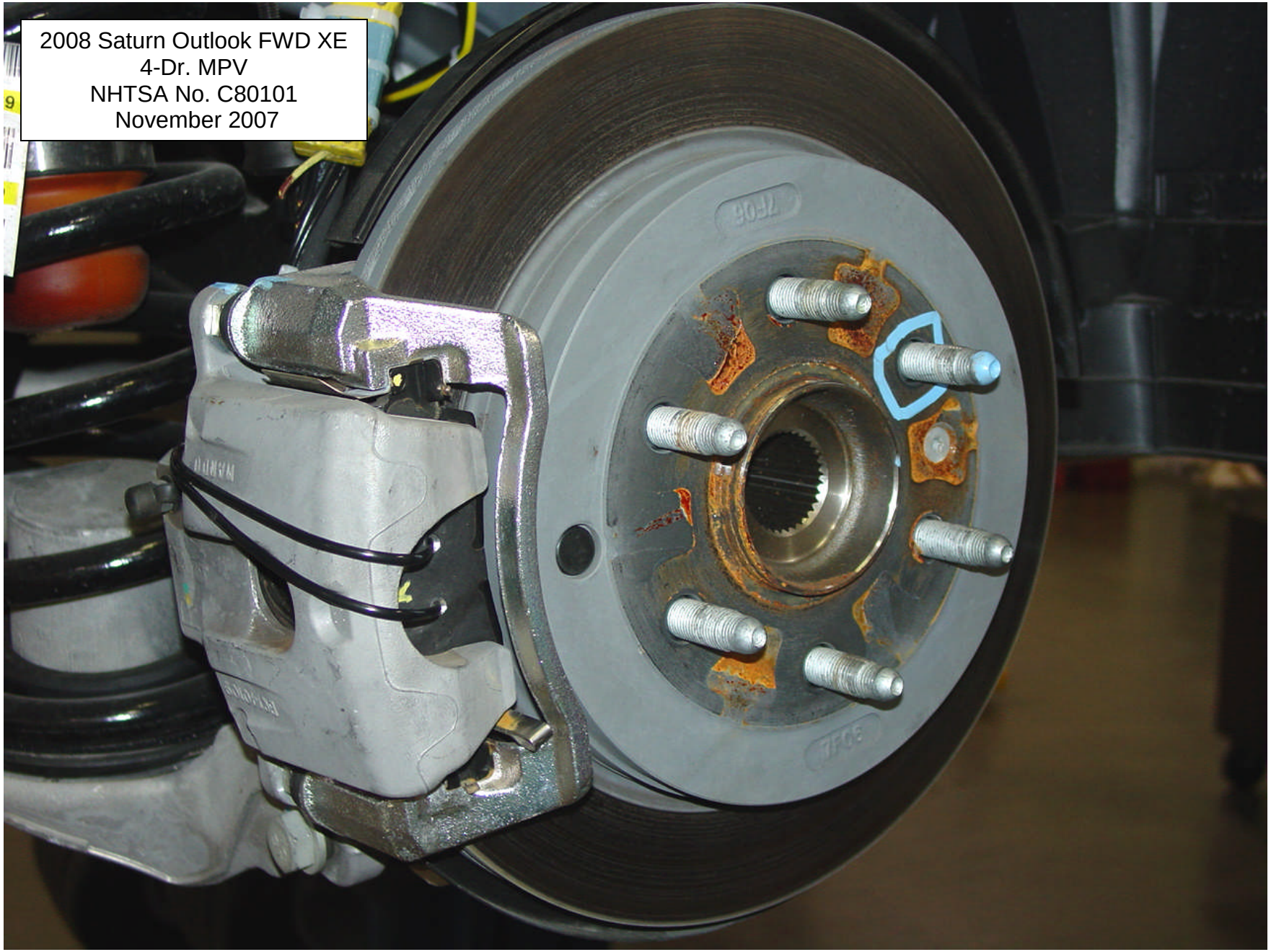
Vehicle Certification Placard

2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

Vehicle Tire Information Label



Left Front Thermocouple Installation

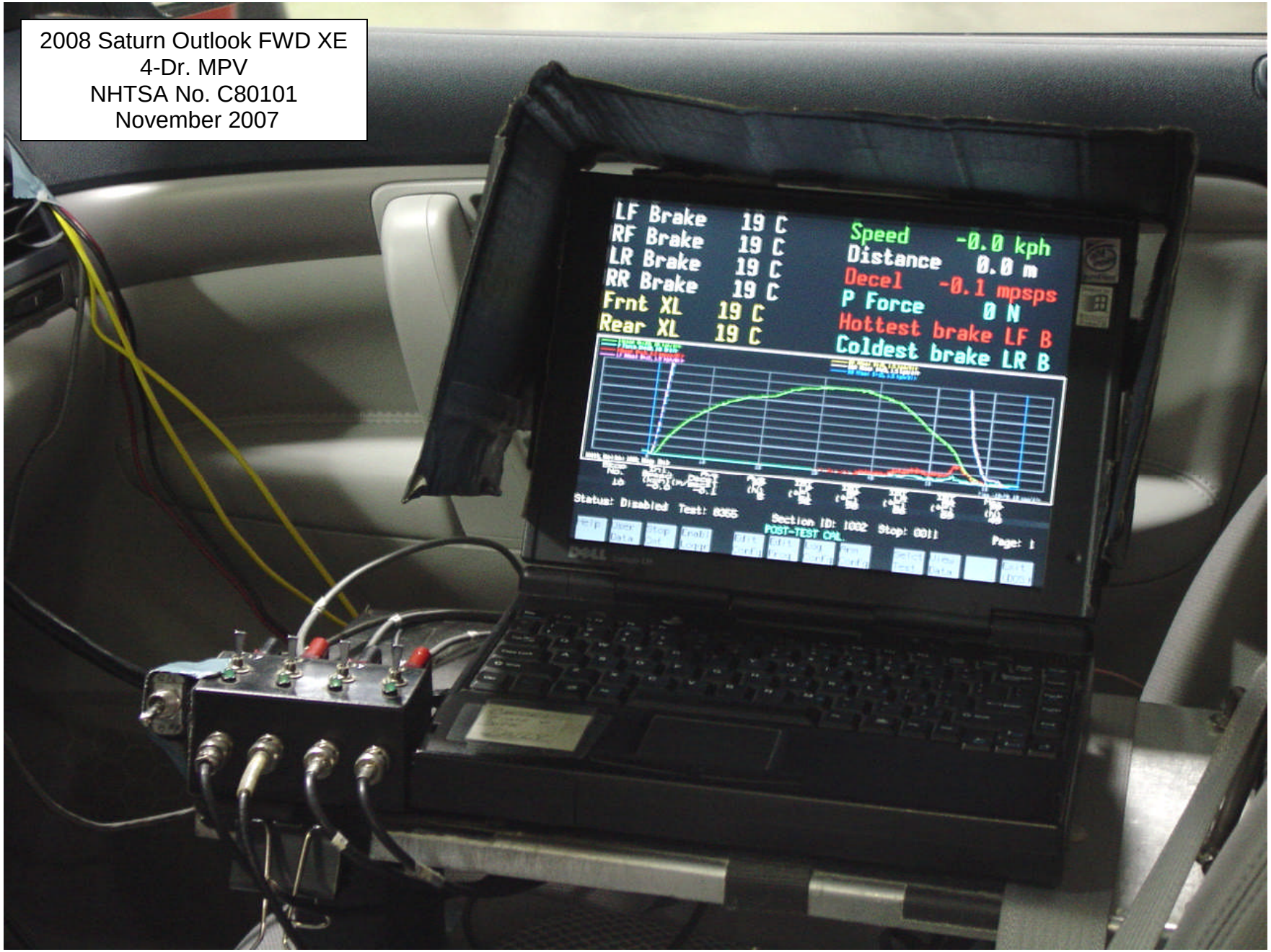


Right Rear Thermocouple Installation

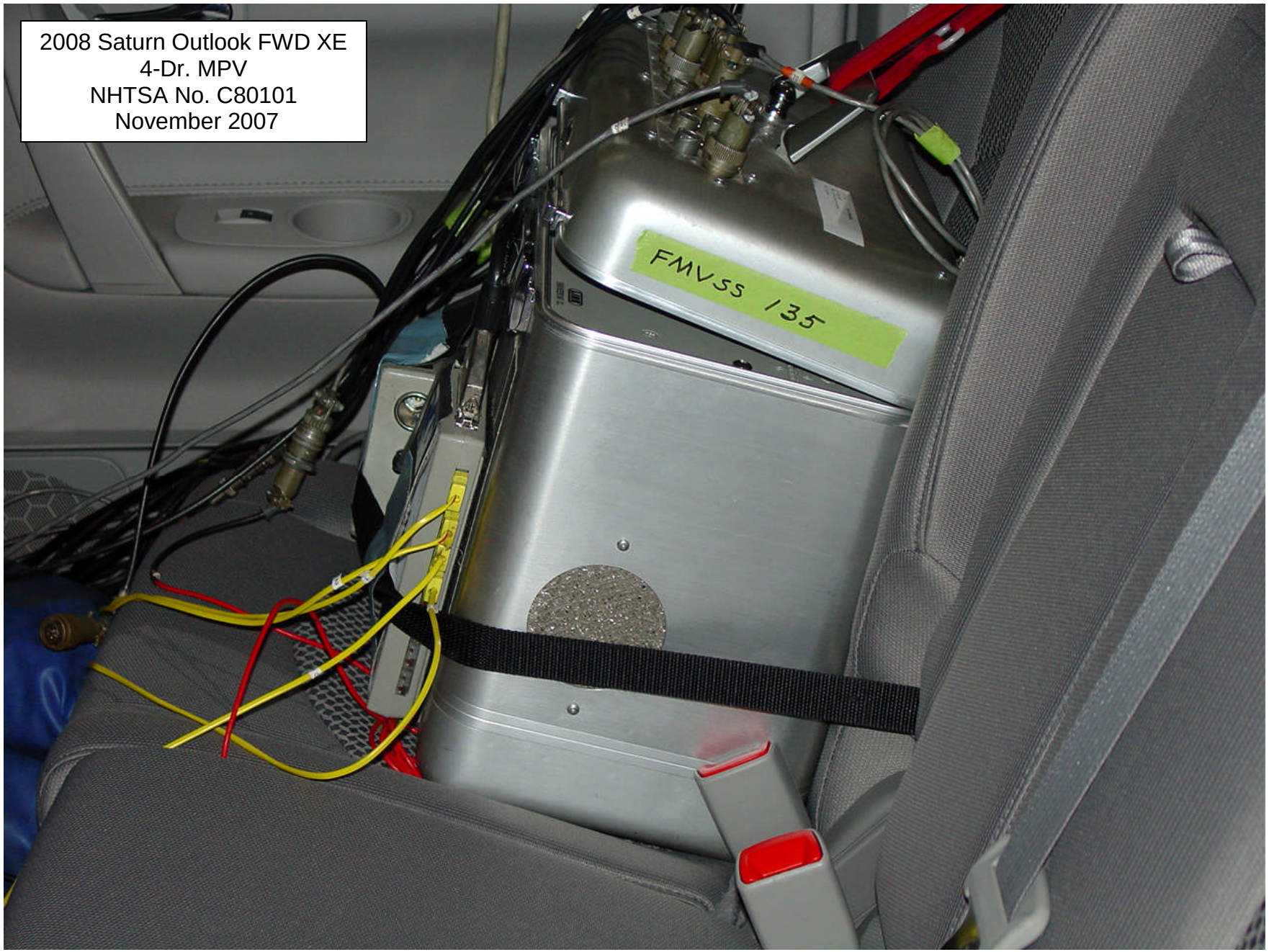
2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

Test Instrumentation in Vehicle

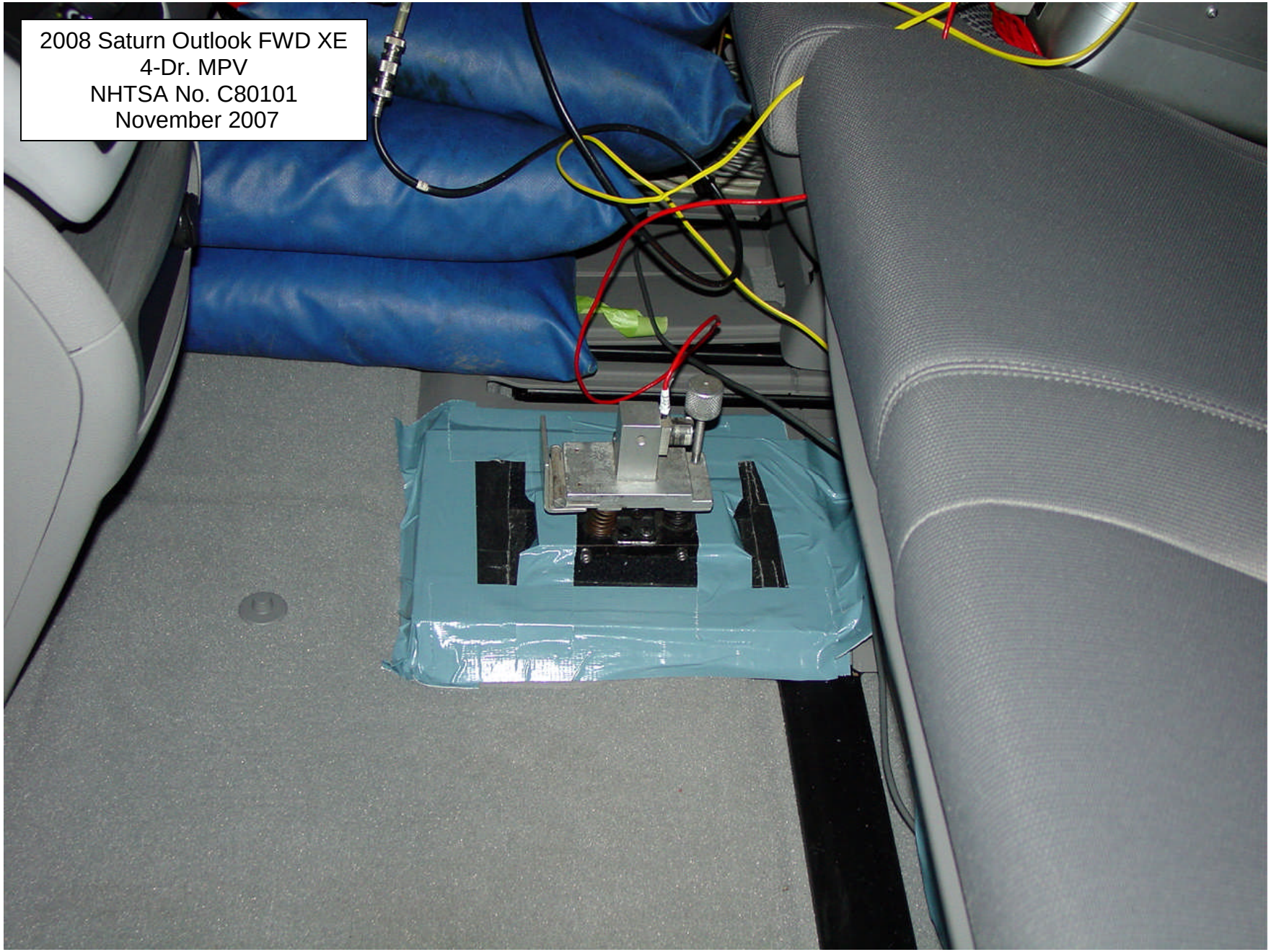
2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007



Test Instrumentation in Vehicle



Test Instrumentation in Vehicle



Test Instrumentation in Vehicle

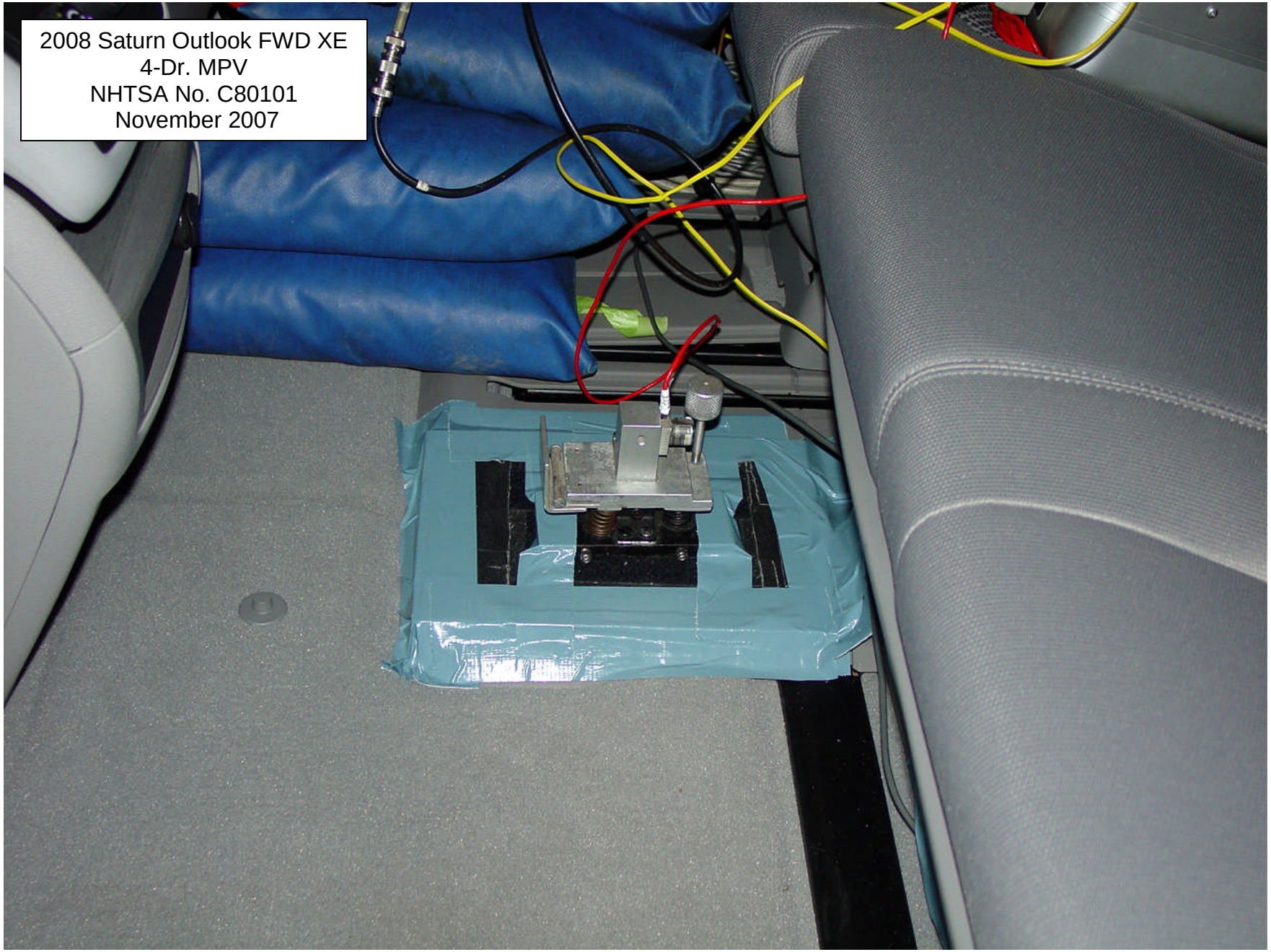
2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

Test Instrumentation in Vehicle

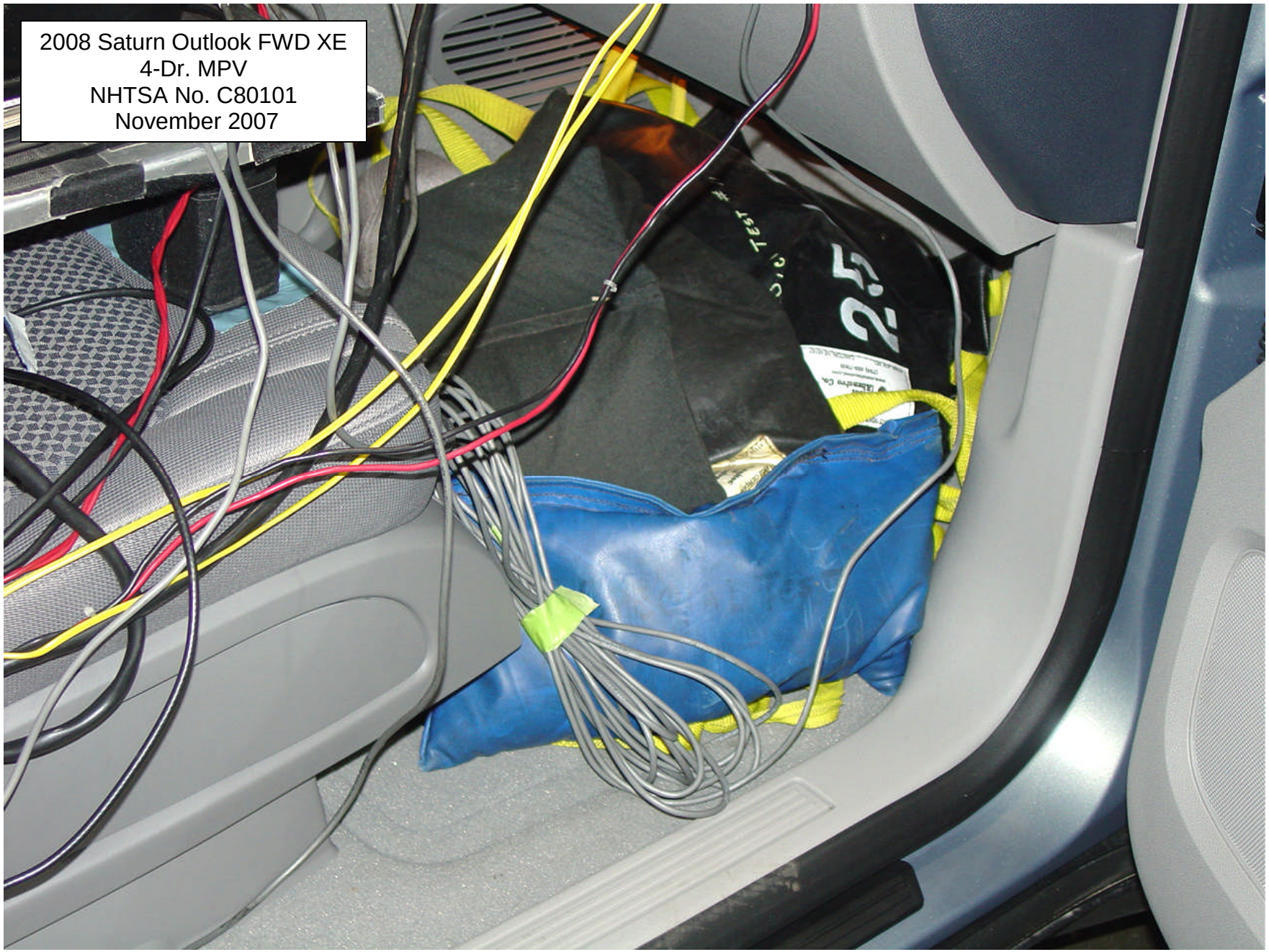
Vehicle Being Weighed

Ballast in Vehicle

Ballast in Vehicle



Ballast in Vehicle



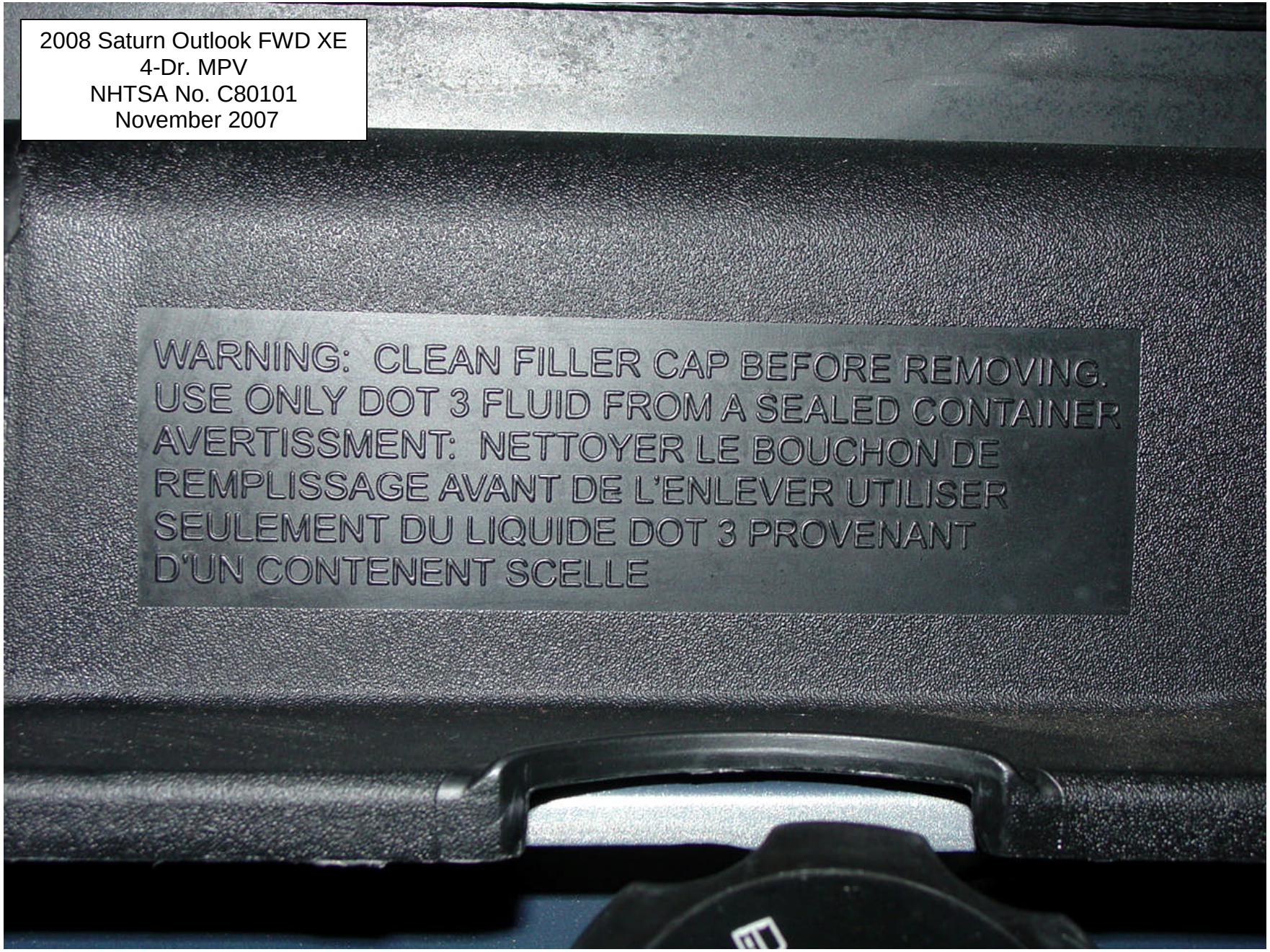
Ballast in Vehicle

2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

Brake System Indicator (Warning) Lamp

Brake System Indicator (ABS) Lamp

2008 Saturn Outlook FWD XE
4-Dr. MPV
NHTSA No. C80101
November 2007

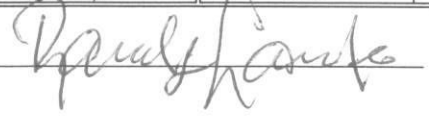


Brake Fluid (Master Cylinder) Reservoir Warning Label

7.0 INSTRUMENT CALIBRATION (12 MONTH MAXIMUM INTERVAL)

VEHICLE: 2008 Saturn Outlook FWD XE ; NHTSA NO.: C80101; DATE: 10/30/07

INSTRUMENT	SERIAL NUMBER	CALIBRATION DATE	NEXT CALIBRATION
Data Acquisition System - Link DAS 2082	975016	07/17/07	07/17/08
Computer – Dell/Link Engrg.	TRC-43207	Not Applicable	Not Applicable
Software - Link Engrg. Rev Data	TRC Propr.	NA	NA
LF Torque Wheel	Not Utilized		
RF Torque Wheel	Not Utilized		
LR Torque Wheel	Not Utilized		
RR Torque Wheel	Not Utilized		
Stopwatch – Fisher Scientific (Heating Snubs)	SN-97216633	08/21/07	08/21/08
Stopwatch – Accusplit (Daily Cals)	SW ST03	08/21/07	08/21/08
Tire Pressure Gauge – WIKA	AG-101	08/07/07	11/07/07
Pedal Force Transducer – Sensor Devel	169755	Each Test	Each Test
Asst. Pipe-Handle Steel Weights - Ohaus	LB-0001	05/05/07	05/05/08
Park Brake Force Transducer – Lebow	LC-42631	Each Test	Each Test
LF Hydraulic Pressure Transducer	Not Utilized		
RF Hydraulic Pressure Transducer	Not Utilized		
LR Hydraulic Pressure Transducer	Not Utilized		
RR Hydraulic Pressure Transducer	Not Utilized		
Accelerometer - Setra (+ or – 15 g) 141A	A-1055763	Each Test	Each Test
Fifth Wheel – ADAT DSR-06 Radar	140.0229	Each Test	Each Test
Wind Velocity/Direct. – Davis Model 6410	070321N03	03/21/07	03/21/08
Ambient Temp. Gage–Davis Mod. 6150C	070321N01	03/21/07	03/21/08
LF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RF Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
LR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
RR Brake Thermocouple - Temprel/Link	T52-0B-24K	Ea. Test w/Link	Ea. Test w/Link
Lock-up Detection System	TRC Propr.	Each Test	Each Test
Vehicle Weight – Toledo/Mettler Scales JAGXTREME 3000000, (Bldg. 70)	SN 5225831-5JC	08/20/07	11/20/07

QUALITY ASSURANCE 

DAILY CALIBRATIONS (1 of 3)

Vehicle: 2008 Saturn Outlook FWD XE NHTSA No.: C80101

Deceleration Calibration Data for Unit 8355
Desired full scale value is: 9.81 m/s/s
Allowed deviation is: + or - 0.15 m/s/s

		"Date"	"Time"	Zero	Cal	
		"stp"	"stp"	"Decel"	"Decel"	
Accelerometer	Level to zero, then tilt to full scale	10/29/2007	14:15:56	-0.03	9.82	PRE TEST CAL
		10/31/2007	13:04:51	0.02	9.76	
		10/31/2007	15:34:57	-0.10	9.78	
		11/1/2007	8:48:58	0.00	9.90	
		11/1/2007	15:27:05	0.03	9.80	
		11/2/2007	9:32:46	-0.04	9.86	
		11/5/2007	11:29:42	0.00	9.78	
		11/5/2007	16:52:46	0.01	9.77	
		11/6/2007	11:14:24	-0.02	9.78	
		11/6/2007	15:42:55	0.00	9.84	
		11/7/2007	10:48:21	0.04	9.74	POST-TEST CAL.

Pre-Test Linearity Check 10/29/2007

Actual (m/s/s)	Rec. (m/s/s)
0.0	0.0
3.0	3.0
6.1	6.1
9.8	9.8

Post-Test Linearity Check 11/06/2007

Actual (m/s/s)	Rec. (m/s/s)
0.0	0.0
3.0	3.0
6.1	6.1
9.8	9.8

Distance Calibration Data for Unit 8355
Desired full scale value is: 1000 m
Allowed deviation is: 3 m

		"Date"	"Time"	Distance for	
		"stp"	"stp"	1000 meters	
Light beam distance sensor	Drive from 0 to 100 to 0 km/h on a measured kilometer	10/30/2007	9:23:26	1000.0	PRE-TEST CAL.
		10/31/2007	13:17:08	999.9	
		10/31/2007	15:42:39	1003.3	
		11/1/2007	9:23:36	999.6	
		11/1/2007	15:32:58	999.4	
		11/2/2007	9:42:11	997.3	
		11/5/2007	11:35:17	996.3	
		11/5/2007	17:00:47	998.2	
		11/6/2007	11:18:35	998.5	
		11/6/2007	15:48:37	998.6	POST-TEST CAL.

DAILY CALIBRATIONS CONTINUED (2 of 3)

Vehicle: 2008 Saturn Outlook FWD XE NHTSA No.: C80101

Wheel Tachometer Calibrations for Unit 8355

Wheel tachometer calibrations: all wheel speeds should be 15 km/h

Wheel lock detector — While at a standstill, check zeros. Drive vehicle at approx. 15 km/h and engage zero speed switch for each wheel

"Date"	"Time"	Zero	@15km/h	Zero	@15km/h	Zero	@15km/h	Zero	@15km/h	
stp	stp	LF	LF	RF	RF	LR	LR	RR	RR	
10/31/2007	13:08:34	0.0	17.4	0.0	15.0	0.0	17.1	0.0	16.0	PRE-TEST CAL
10/31/2007	15:37:20	0.0	16.9	0.0	14.5	0.0	16.6	0.0	15.4	
11/1/2007	9:27:56	15.5	17.1	0.0	14.7	0.0	16.8	0.0	15.8	
11/1/2007	9:30:19	0.0	18.1	0.0	15.6	0.0	17.8	0.0	16.5	
11/1/2007	15:29:04	-0.3	17.6	0.0	15.3	0.0	17.5	0.0	16.4	
11/2/2007	9:44:13	0.0	17.6	3.7	23.3	0.0	17.2	0.0	16.2	
11/5/2007	11:37:20	0.0	17.6	-8.5	15.1	0.0	17.2	0.0	16.3	
11/5/2007	16:55:25	0.0	17.0	-7.1	14.8	0.0	16.9	0.0	15.9	
11/6/2007	11:21:05	0.0	17.2	-10.5	14.7	0.0	16.9	0.0	15.8	
11/6/2007	14:38:25	0.0	17.4	1.6	19.8	0.0	17.1	0.0	15.9	
11/6/2007	15:43:58	0.0	17.0	0.0	15.8	0.0	16.6	0.0	15.7	POST-TEST CAL.

When driven over 15 km/hr and the wheel tack generators are shunted to zero volts, does the graphical screen indicate wheel lock at position?: __X__ Yes, _____ No.

*Note: RF wheel speed is recorded in the performance stop data. DAS problem did not allow display in calibration mode.

Pedal Force Meter Calibration for Unit 8355

Target shunt calibration is 387 N

Desired recorded value is: 387 N

Desired recorded actual force calibration check value is: 500 N

Allowed deviation is: 6.5 N

Service brk pedal effort — Driver engages a fixed shunt cal switch.

"Date"	"Time"	Zero	Cal Val	
stp	stp	Force	Force lb	
10/29/2007	14:05:43	-0.5	499.0	PRE-TEST CAL.
10/31/2007	13:05:18	-0.1	387.9	
10/31/2007	15:33:11	-0.3	387.6	
11/1/2007	8:47:15	-0.1	387.8	
11/1/2007	15:26:41	-0.3	387.6	
11/2/2007	9:32:15	-0.3	387.6	
11/5/2007	11:28:53	-0.4	387.4	
11/6/2007	11:12:41	-0.8	387.0	
11/6/2007	15:42:30	-0.2	387.4	
11/7/2007	11:09:04	-0.3	500.0	POST-TEST CAL.

Pre-Test Linearity Check - 10/29/07

Actual Force (N)	Recorded Force (N)
0	0
222	222
445	445
498	498

Post-Test Linearity Check - 10/23/07

Actual Force (N)	Recrdd Frc(N)
0	0
222	221
445	443
498	495

DAILY CALIBRATIONS CONTINUED (3 of 3)

Vehicle: 2008 Saturn Outlook FWD XE NHTSA No.: C80101

Dynamic Speed Calibration for Unit 8355

Desired speed value is: 100 km/h
Allowed deviation is: 1.6 km/h
Desired time value is: 36 seconds
Allowed deviation is: + or - 0.6 seconds

		"Date"	"Time"	"Speed"	Time"	
		stp	stp	km/h	sec	
Light beam speed sensor	Drive vehicle at a steady 100 km/h through a kilometer.	10/30/2007	9:27:26	100.2	36.12	PRE-TEST CAL.
		10/31/2007	13:25:33	100.3	36.06	
		10/31/2007	15:40:00	100.0	36.06	
		11/1/2007	8:50:35	100.0	36.21	
		11/1/2007	15:30:57	100.2	35.87	
		11/2/2007	9:36:01	100.2	35.87	
		11/5/2007	11:33:04	99.9	35.94	
		11/5/2007	16:58:00	100.0	35.87	
		11/6/2007	11:15:57	100.3	35.90	
		11/6/2007	15:46:14	100.3	36.03	POST-TEST CAL.

APPENDIX A

Copy of Manufacturer's Sticker

SATURN

2008 OUTLOOK FWD XE

EXTERIOR: OCEAN MIST
INTERIOR: GRAY

ENGINE, 3.6L VVT V6
TRANSMISSION, 6 SPEED AUTO

Visit us at www.saturn.com

STANDARD EQUIPMENT

ITEMS FEATURED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD VEHICLE PRICE SHOWN

- 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY SEE DEALER FOR DETAILS
- 30 DAY/1500 MILE VEH EXCHANGE
- 24 HOUR ROADSIDE ASSISTANCE

MECHANICAL

- ENGINE, 3.6L VVT V6
- SINGLE EXHAUST
- OIL LIFE MONITORING SYSTEM
- RIDE AND HANDLING SUSPENSION
- TRANSMISSION 6-SPEED AUTO FWD

SAFETY & SECURITY

- ANTILOCK BRAKE SYSTEM
- STABILITRAK-STABILITY CONTROL
- TRACTION CONTROL SYSTEM
- AIR BAGS, DUAL FRONTAL
- HEAD CURTAIN SIDE AIR BAGS
- FRONT SIDE IMPACT AIR BAGS
- PASSENGER SENSING SYSTEM
- CHILD SAFETY LATCH SYSTEM
- POWER DOOR LOCKS & WINDOWS WITH DRIVER EXPRESS DOWN
- 1 YR ONSTAR SAFE & SOUND (ASK DLR ABOUT TURN-BY-TURN NAV UPGRADE)
- THEFT-DETERRENT SYSTEM
- REMOTE KEYLESS ENTRY

EXTERIOR

- AUTOMATIC HEADLAMPS
- DAYTIME RUNNING LAMPS
- REAR MANUAL LIFTGATE
- PWR HEATED OUTSIDE MIRRORS, DUAL
- BODYSIDE MOLDINGS, BLACK
- 18" PAINTED ALUMINUM WHEELS

INTERIOR

- CLOTH SEATS
- SEATS, FRONT BUCKET
- 8 PASS SEATING W/2ND & 3RD ROW SPLIT BENCH SEAT
- SMART SLIDE 2ND ROW FEATURE
- FRONT & REAR AIR CONDITIONING
- REAR ELECTRIC DEFOGGER
- AM/FM STEREO, CD/MP3 FORMAT
- AUDIO SYSTEM WITH SPEAKERS
- CENTER CONSOLE, FRONT FLOOR
- CRUISE CONTROL
- STEERING, TILT & TELESCOPING
- CARGO STORAGE
- XM SATELLITE RADIO - SERVICE FEE EXTRA 1ST 3 MONTHS INCL.

OPTIONS & PRICING

MANUFACTURER'S SUGGESTED RETAIL PRICE

STANDARD VEHICLE PRICE $27,605.00

OPTIONS INSTALLED BY THE MANUFACTURER (MAY REPLACE STANDARD EQUIPMENT SHOWN)

TOTAL OPTIONS	$0.00
TOTAL VEHICLE & OPTIONS	$27,605.00
DESTINATION CHARGE	735.00

TOTAL VEHICLE PRICE* $28,340.00

EPA Fuel Economy Estimates

These estimates reflect new EPA methods beginning with 2008 models.

CITY MPG
16
Expected range for most drivers **13** to **19** MPG

Estimated Annual Fuel Cost
$2,091
based on 15,000 miles at $2.65 per gallon

HIGHWAY MPG
24
Expected range for most drivers **19** to **29** MPG

Combined Fuel Economy
This Vehicle
19
10 — 30
All **SUVS**

Your actual mileage will vary depending on how you drive and maintain your vehicle.

R7A

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

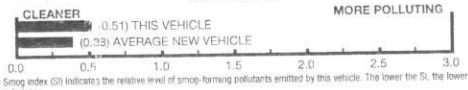
GOVERNMENT SAFETY RATINGS

This vehicle has not been rated by the government for frontal crash, side crash or rollover risk.

Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

SMOG INDEX



Note: The Smog index (SI) indicates the relative level of smog-forming pollutants emitted by this vehicle. The lower the SI, the lower the vehicle's emissions.

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE:
U.S./CANADIAN PARTS CONTENT: 77%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: LANSING, MI
U.S.A.
COUNTRY OF ORIGIN:
ENGINE: UNITED STATES
TRANSMISSION: UNITED STATES

This label has been applied pursuant to Federal law - Do not remove prior to delivery to the ultimate purchaser. "Includes Manufacturer's Recommended Pre-Delivery Service. Does not include dealer installed options and accessories not listed above, local taxes or license fees.

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GMLBL_PROD_0010 - 06/03/2007

ORDER NO MBVR01 SALES CODE E
SALES MODEL CODE ZR14526
DEALER NO 10072
FINAL ASSEMBLY LANSING, MI U.S.A.

VIN 5GZER13718J111834

RETAILER TO WHOM DELIVERED
SATURN OF WAUKESHA
1610 MANHATTAN DRIVE
WAUKESHA, WI 53186

DV
1GA0087591

APPENDIX B

Discussion on Data

DISCUSSION ON DATA

Symbols for Brake Components

4	-	4 Wheel	G	-	Groan	DL	-	Deceleration (State FPSPS)
X	-	Skid	SQ	-	Squeal	PF	-	Pedal on Floor
L	-	Left	SQK	-	Squeak	SCP	-	Shoe Scrape
R	-	Right	PO	-	Pinchout	RB	-	Rubber Banding
R	-	Rear	P	-	Pull	O	-	Odor
F	-	Front	R	-	Shudder	NOX	-	No Skid
B	-	Both	M	-	Momentary			

INT or INIT	-	Initial Part of Stop
MID	-	Middle of Stop
END	-	End of Stop

All stops were made manually.

APPENDIX C

Contractor's Comments
Procedure Modifications
and
Test Facility

Comments for vehicle C80101.

For all recorded decelerations:

The recorded *average* deceleration values for the tests are slightly lower than that which is required or targeted for certain test sections. However, in all cases and in reality, the driver maintained the correct required/target deceleration values for the majority of time for each of those stops. The recorded deceleration is acquired from the moment the service brake pedal is moved until the vehicle reaches zero speed. Therefore, the time needed to achieve the target deceleration (rise time) and the time the vehicle goes from the target deceleration to zero (fall time) is included in the average deceleration calculation. The rise and fall times were added to the entire length of the stops. Hence, the recorded average deceleration values were generally and slightly less than the required/target deceleration values.

7.5-MILE TEST TRACK

The 7.5-mile test track encloses a 1,600-acre area, one mile wide and 3.5 miles long.

The track has a downward grade, north to south, of 0.228 percent and a cross slope in the straightaways of 3/16 inch per foot. The 1.88 mile long straightaways flow into transition areas 2,300 feet in length and then into 5,275-foot long curves with a constant radius of 2,400 feet. The 36-foot wide straightaways and the 42-foot wide curves provide three test lanes. Paved berms, 12 feet in width, border the straightaways and the inside of the curves.

As a vehicle moves toward the outside of the track in the curves, it encounters a progressively steeper bank. The inside lane (or "slow" lane) has a bank of 10 degrees allowing a neutral speed of 80 mph with no side forces. In the center lane, the slope increases to 19 degrees resulting in a neutral speed of 110 mph. The outside lane's 28-degree bank allows a 140 mph neutral speed. Rimming the outer lane is a seven-foot safety lane culminating in a 36-degree slope at the guardrail.

The facility is paved with Portland cement concrete. It carries a maximum single axle load of 36,000 pounds and a maximum tandem axle load weight of 48,000 pounds. Special provisions can be made for heavier weight loads.

With 22.5 lane miles, our track will accommodate many vehicles simultaneously. Research which utilizes the track includes component performance and durability studies, brake tests, aerodynamic studies, fuel economy studies, drive line efficiency tests, and the determination of vehicular acceleration and cruise characteristics. In addition, it supports maximum speed determination, road load power, noise and emission measurements and tire durability test programs.

The 7.5-mile test track can be used in conjunction with other facilities at TRC. It provides an excellent area for pre-test conditioning of equipment such as brake burnishing, tire break-in, and vehicle warm-up.

TRC SKID PAD

The Skid Pad is a test facility which is utilized primarily for the evaluation of tire and brake systems.

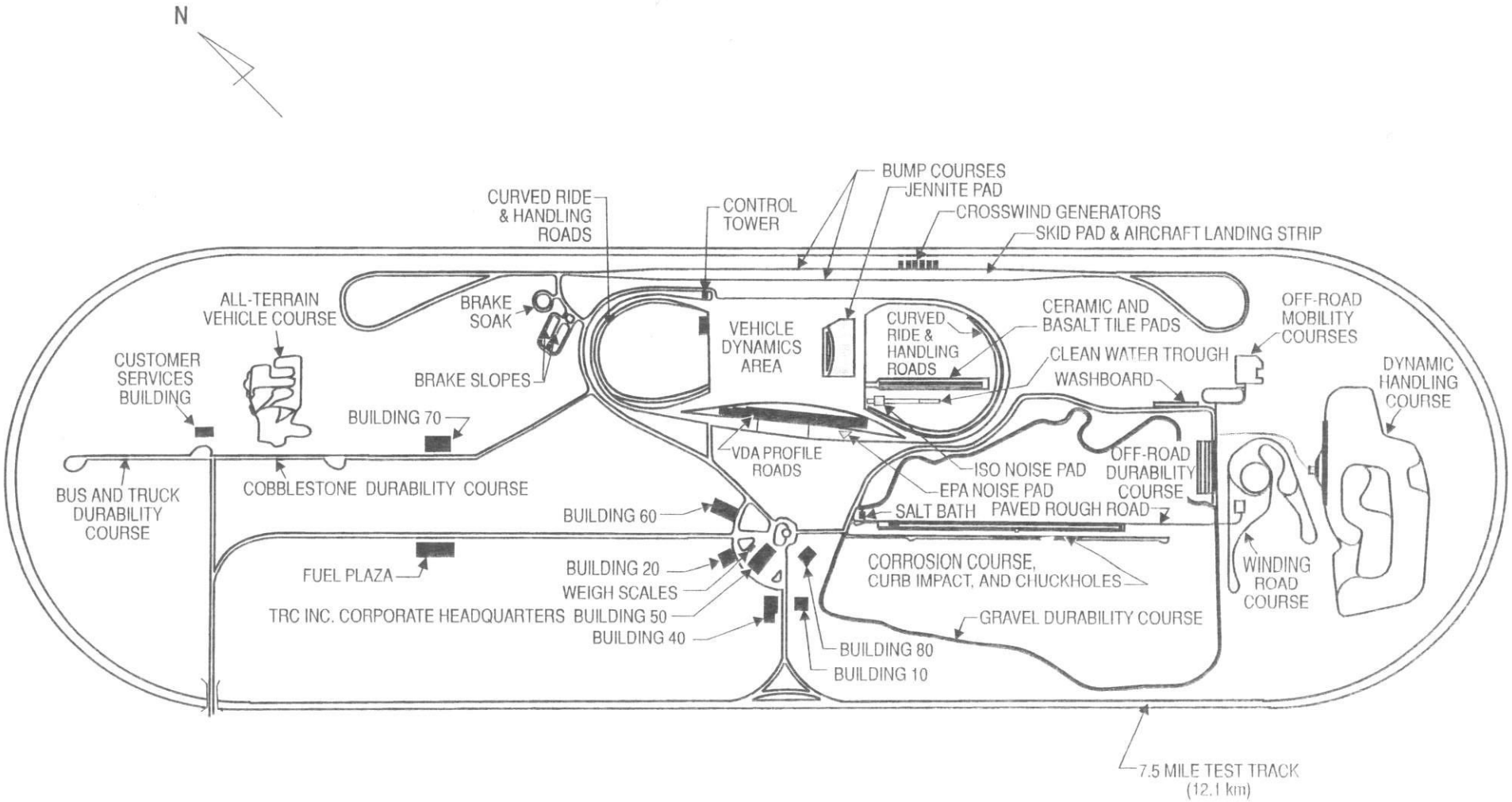
The overall dimensions of the pad are 9,000 feet by 84 feet with loops on the north and south ends. Both turnaround loops have a 309-foot radius and are 16 feet wide with a 25 percent super elevation. They will accommodate speeds of 45 mph with zero side force and 60 mph with .5 g's lateral acceleration. The acceleration/deceleration lanes at each end are 3,280 feet in length.

A test area of 210,000 square feet is situated in the center of the skid pad containing several test pads with varying surface textures. Skid numbers in this area range from 30 (wet) to 80 (dry).

The skid pad is paved with Portland cement. The load capacity of the skid pad is 36,000 pounds maximum single axle weight and 48,000 pounds maximum tandem axle weight.

Varying surface textures in the main test area are ideal for testing tire and/or brake system performance on different surfaces as characterized by "skid numbers." The skid pad is also used for acceleration studies, aerodynamics, rolling resistance, noise testing, and vehicle top speed determination.

The subject test vehicle was rear wheel anti lock equipped. Rather than rapidly and fully applying the service brake control, the driver modulated the service brake control as necessary to control/prevent front wheel lock.



NOT TO SCALE

TEST FACILITY DETAIL

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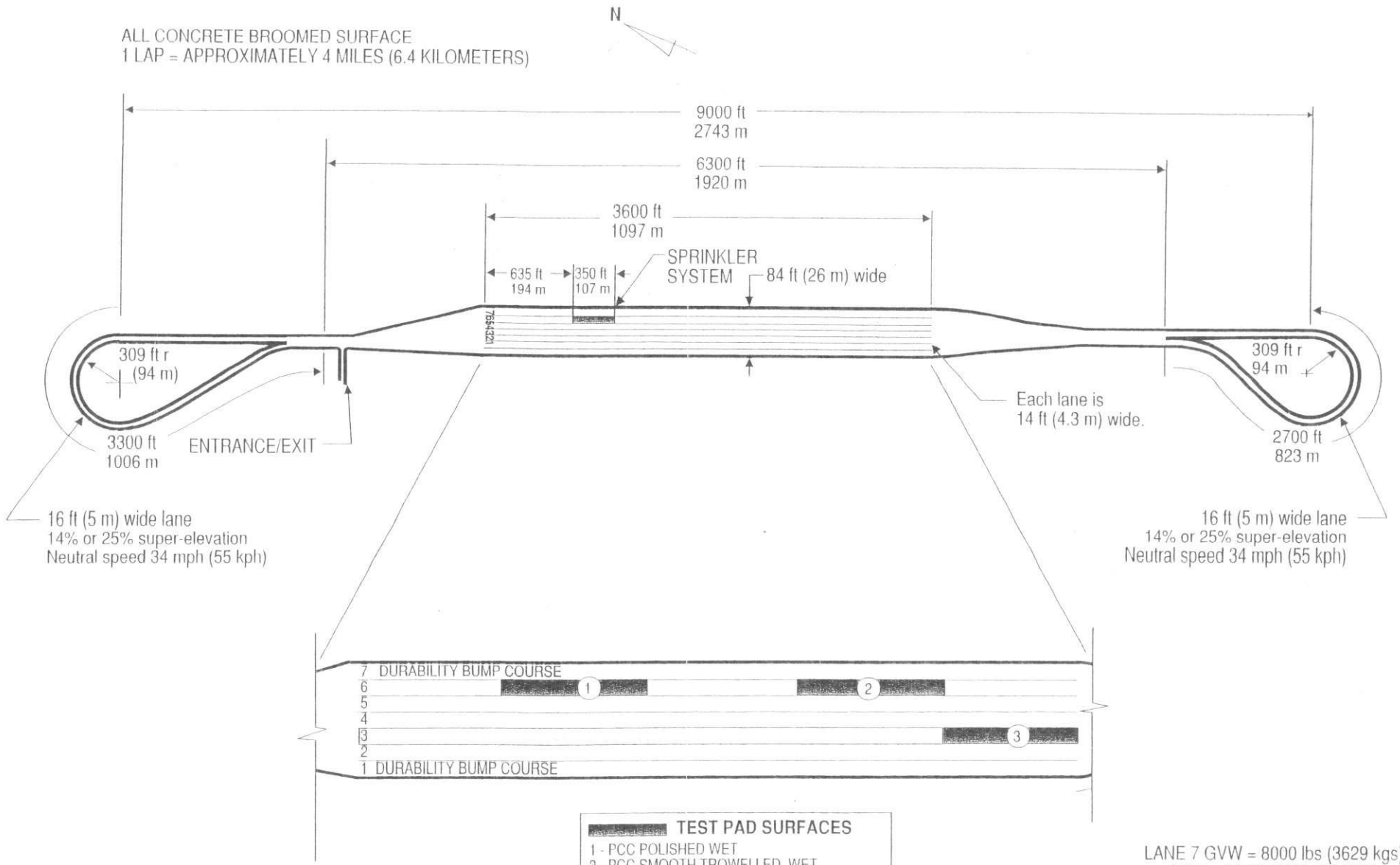
F-15 0605

ALL CONCRETE BROOMED SURFACE
1 LAP = APPROXIMATELY 4 MILES (6.4 KILOMETERS)



LANE 7 GVW = 8000 lbs (3629 kgs)
GVW = 80,000 LBS (36,298 kgs)

NOTE: BUMP COURSES PARALLEL THE PERIMETERS OF LANES 1 AND 7.

Not to scale
All dimensions are approximate

SKID PAD

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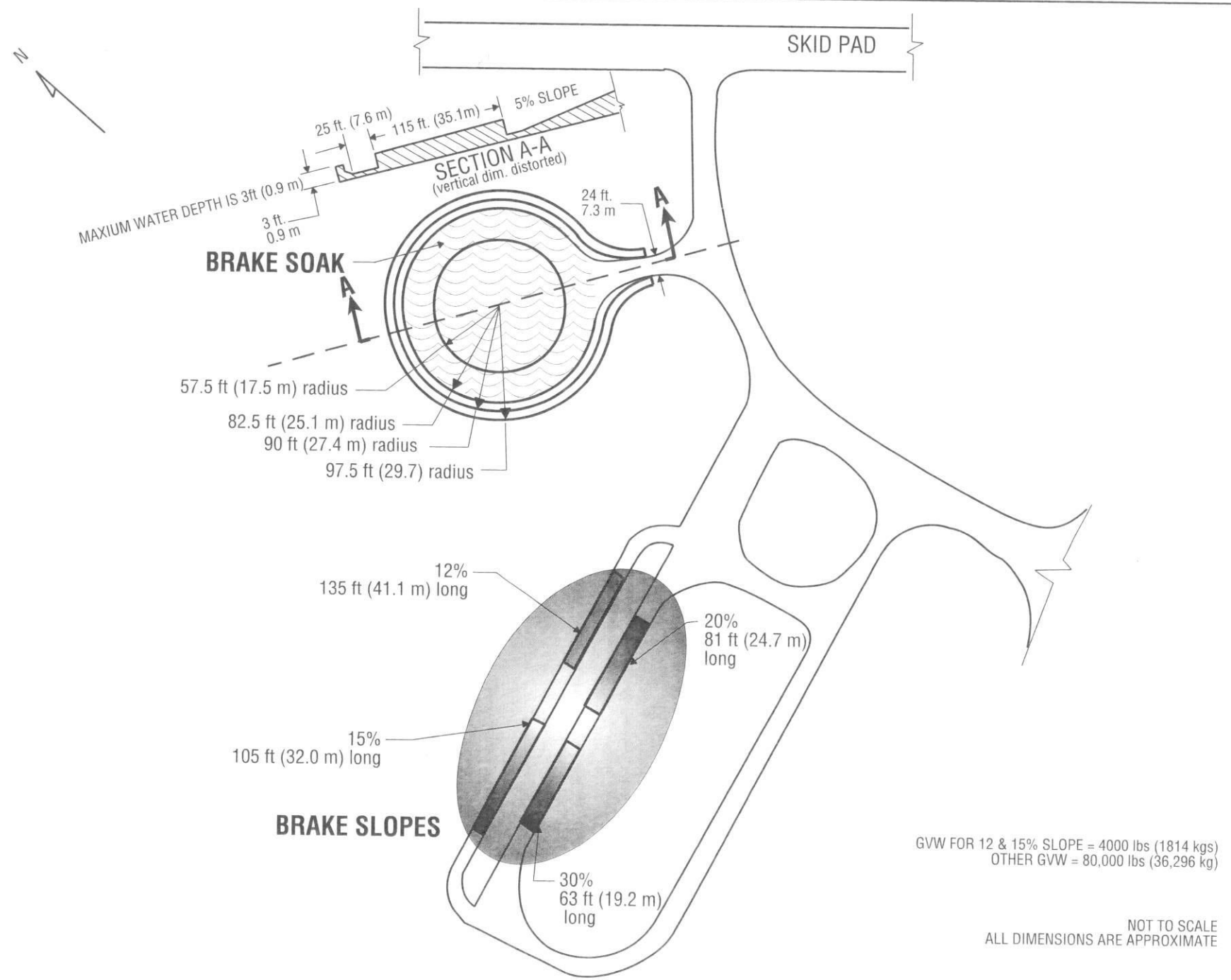

BRAKE SOAK and BRAKE SLOPES

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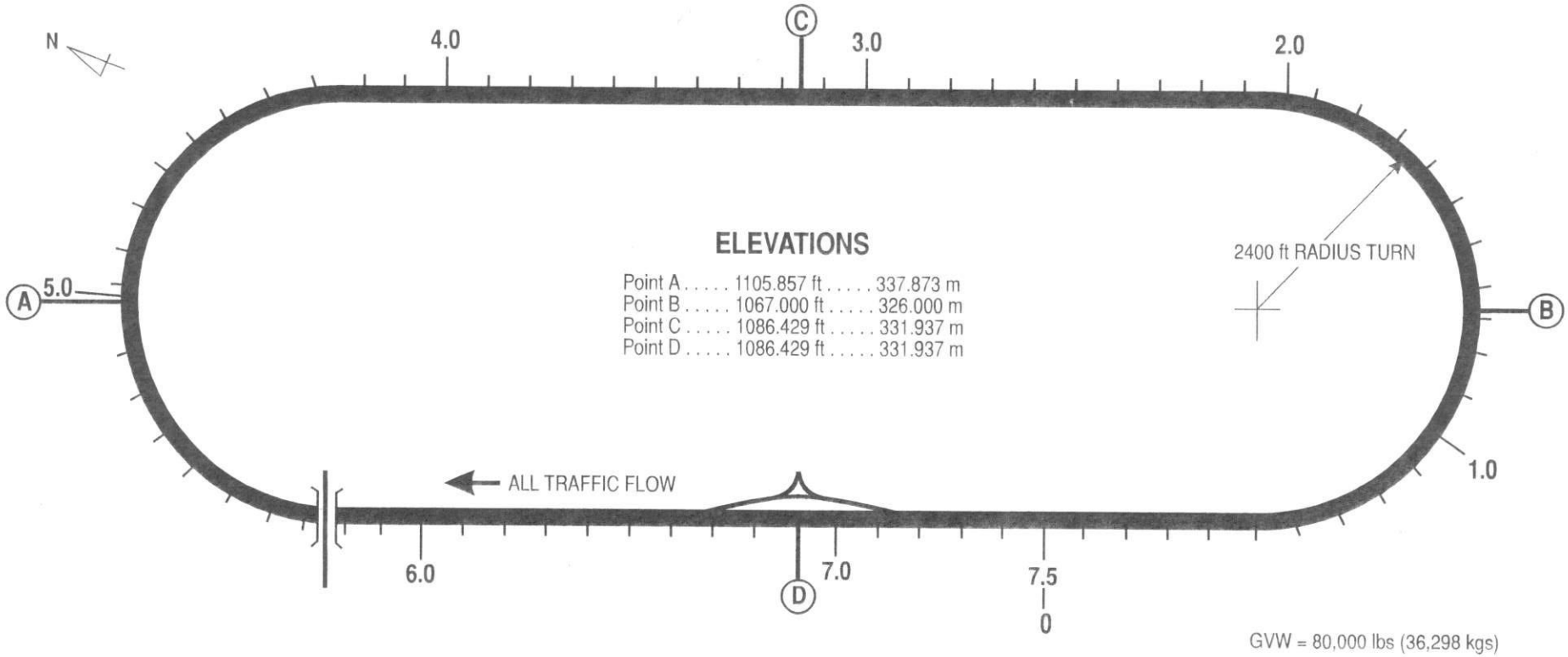
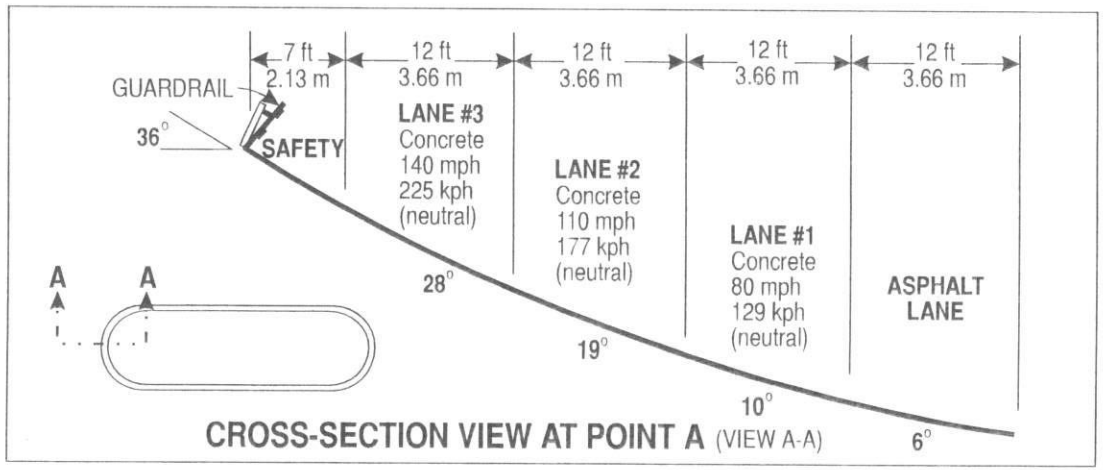
F-3 0500



GVW = 80,000 lbs (36,298 kgs)



CROSS-SECTION VIEW AT POINT A (VIEW A-A)

DISTANCES

Lane 3 . . . . . 7.539 mi . . . . . 12.133 km
Lane 2 . . . . . 7.521 mi . . . . . 12.104 km
Lane 1 . . . . . 7.507 mi . . . . . 12.081 km

Point A to Point B . . . . . 3.333 mi . . . . . 5.364 km
Point C to Point D . . . . . .947 mi . . . . . 1.524 km

NOT TO SCALE

7.5-MILE TEST TRACK

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F-10 0605

APPENDIX D

Notice of Possible Non-Compliance

This vehicle (C80101) met the requirements of the FMVSS 135 standard.